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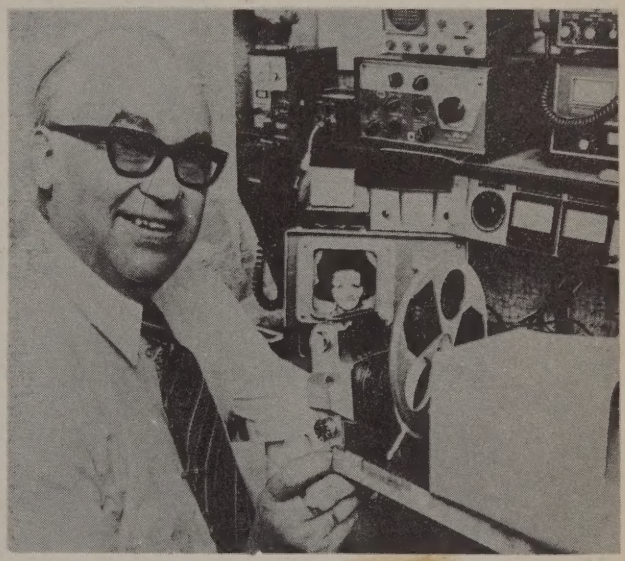
AMATEUR TELEVISION MAGAZINE™

JULY 1982 VOLUME 12 NO. 7 PUBLISHED MONTHLY "OUR 15TH YEAR" $2.00

SUMMER UHF ATV-DX SEASON COMES ALIVE!

Worldwide ATV Satellite Challenge Proposed

3 Generations of A5! Al Lipkin, Henry Ruh, Mike Stone.



Economical Color SSTV
Johnny Bjornulf LA2BK, Norway

- FSTV Space Satellite Repeater!
- VE3CYC Downconverter Project
- August FSTV-UHF Contest Rules!
- UHF-TV DX Monitoring Setup!
- Dayton ATV Report - Part 2
- TVRO - Part 5
- TRS80C 64K Ram Update! K6AEP
- National ARRL Hamvention
- Robot 400 Camera/Quad Mod!
- New Australian Color SSTV Converter
- KB8LU SSTV/Worldradio!
- Color SSTV Equipment Comparisons!
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"Enclosed is $12.45 ($9.95 plus $2.50) for your new FSTV book "Everything You Always Wanted To Know About ATV* but were afraid to ask. I hope to work California this year on 420 mc. on ATV!" -Paul D. Lieb KH6HME, Pahoa, Hawaii

"I just received my 1st issue of A5 Magazine and for some reason missed the January issue. I almost "gave up" to get any magazines over here, but must admit-the March issue 82 "was worth waiting so long for!" Very interesting & informative, please keep up the good work! Enclosed is $3.00 I still owe you for the surface subscription. Hope to "stay tuned" to A5 Magazine for a long-long time!" M. Shoval 4Z4PR, Netanya, Israel.

"Just a note to let you know that I received my "May" issue on April 30th-almost a week after "Dayton". It would have been more beneficial if I could have received it before "Dayton"." -Bill Austin W9BGW, New Salisbury, Indiana (Editor) The May issue was a special "color" issue. Color processing and negatives take much longer to get done than the normal black-white. Also, special handling must be done by the printer to overlay the colors just right. The May issue was mailed around April 22nd (scheduled to be mailed April 10th). Most of the country got their issues around the end of the month which in theory is actually "right on time" (first of the month). Next year? -QCD

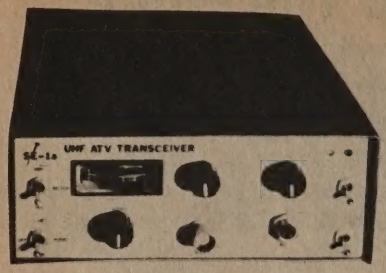
"I read your letter, W3NWA, in the May issue of A5 Magazine and found your point of view quite interesting to say the least! Of course I will expect you and all of the other nets that operate on the frequencies of 3.99, 7.29, 14.29, 21.39 and 28.59 to QRT immediately at the specified times of transmission that W1AW operates! (As I am sure you do?) You see, I like to listen to W1AW. So you and all the the other nets fixed and not to mention established station (quite probably one of the oldest institutions in amateur radio) are really infringing on "my" rights. Then I see you write in to a magazine to tell the editor to tell everyone to stay off your frequency, I just have to laugh! Answer one question for me W3NWA, ok? "WHO THE HELL ARE YOU?" If you did just one-hundredth as much as the ARRL of A5 MAGAZINE has done for amateur radio, I probably would'nt say anything about it. Stick it in your ear! Signed "One agry Ham" -Brian Oertel WB9TPA (copies to A5, QST, 73 and CQ Magazines).

"I just received my May issue of A5 and it is undoubtably "the best yet"! -F. Lamb

"Can you tell me what the "auxillary video output jack" on the rear panel of my Robot 70A is for? Can this be used to put video to a 9 or 12" monitor instead of using the built in CRT?" -Ken Walks KA4WBR, Route #3 Box 97, Rocky Mount, NC -27801 (Editor) Can anyone out there help Ken? -QCD

"Many thanks for the A5 Magazine "sample" issue. The K6AEP TRS80C articles interest me very much! Any further information would be appreciated. Enclosed is some IRC's to help with the postage." -Tom May EI7CZ, Dublin, Ireland (Information sent)

"I have been looking for ATV activity around the Rockford, Illinois for a long time. I am on the air with 200 watts and PC gear. Also interested in FAX on 70 cm. and also Rtty." -Bob Hade WB9SWK, 2107 Bell Avenue. Rockford, Illinois 61103



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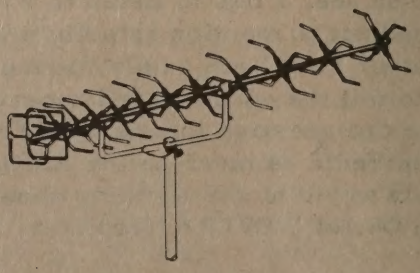

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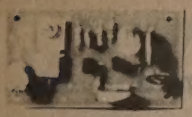
ATV KITS AND MODULES

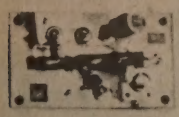


VM-2 **VIDEO MODULATOR** – Wideband collector video modulator for solid state exciters such as those from GLB and Hamtronics. Input for 4.5MHZ audio sub-carrier. 2½" x 1½"; **$13.95** kit, **$18.95** assembled.

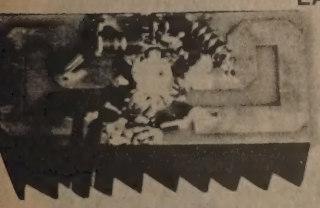
A-2 **4.5MHZ AUDIO SUB-CARRIER** – Accepts audio from VCR or GLB audio processor to provide ATV audio on TV set. Has on-board voltage regulator and shielded inductor. 2 3/4" x 1"; **$18.95** kit, **$24.95** assembled.

SA-1 **VIDEO SYNC AMP** – Provides separate video sync gain control for VM-2 above or SE-1a transceiver. Useful when driving solid state amps. 1 3/4" x 1 1/4"; **$14.95** assembled, **$11.95** kit.

DC–1 **UHF CONVERTOR** – Varactor tuned with 2 RF stages. MRF901 input standard. Double sided stripline design. Outputs to TV ch. 2, 3 or 4. Can be tower mounted. 11 – 14vdc. 2" x 3". $34.95 kit, **$49.95**, assembled, **$79.95** complete in box. Add **$15.00** for NE64535 1st stage.



P-1 **WIDEBAND LOW NOISE UHF PREAMP** – Uses MRF901 transistor to provide 16db gain and 1.7db noise figure. Covers 420–450MHZ band. Other frequencies received with change in input inductor. 2 1/4" x 1 3/8"; **$17.95** kit, **$26.95** assembled. Add $15.00 for NE64535 Option.



LA-1 **UHF AMPLIFIER** – Uses 15 watt MRF641 transistor with 7.8db gain @ 470MHZ. Stripline inductors with on-board pin diode antenna switching for a receiver. Designed for wideband color video with exciters such as the GLB T450L that provides up to 3 watts drive. Drilled and tapped heatsink included (4 1/2" x 1 3/4"). 1 to 3 watts drive typically gives 6 to 18 watts output. 12 – 14vdc operation @ 4 amps max. Double-sided board is 4 ½" x 2". **$69.95** assembled with test data.

LA–45 UHF AMPLIFIER – Uses MRF646. Input power of 6-15 watts typ. gives 20-50 watts output. Biased for linear operation. Kit includes all parts, instructions and 4.2" x 3" double-sided stripline board. Needs 12-14 vdc @ 9 amps max. **$59.95** kit.

GLB T450L TRANSMITTER – 4 1/2" x 2" RF board typically supplies 2–3 watts FM output, 1 – 1½ watts average video RF output. Changes for wideband video modulation provided. Comes with crystal for 439.25MHZ, with other frequencies available upon request. Also includes separate 1" x 4" audio processor board which supplies audio for FM modulation or for the A–2 4.5MHZ audio kit above. 12–14vdc @ 2 amps max. **$54.95** kit, **$74.95** assembled and tuned.

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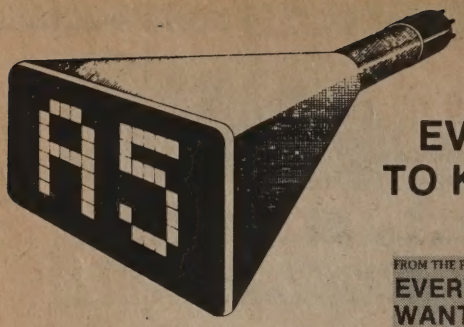

FROM THE PUBLISHERS OF A5 ATV MAGAZINE

EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT ATV* but were afraid to ask

by Mike Stone WB0QCD

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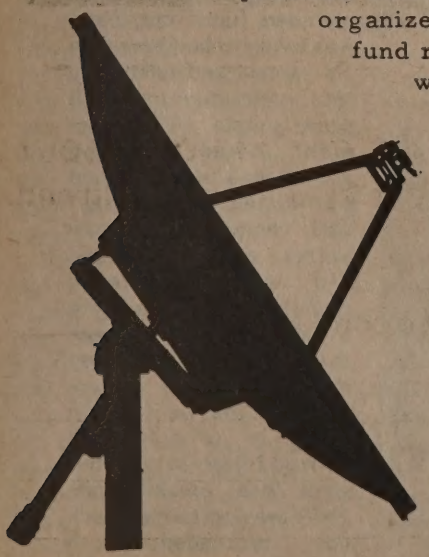
"AND NOW, LIVE AND DIRECT FROM SATELLITE..." Here's Henry Ruh KB9FO on Future ATV!

It is totally within the realm of current technology to perform a "marriage" between satellite technology and "fast scan television". In early discussions with AMSAT at the Dayton 1982 Hamvention, it was agreed that it would be possible to achieve fast scan AM (not FM as commercial satellites use) transponder channel which would allow continental and perhaps even international FSTV between Amateurs! The system would have to use SHF frequencies to comply with international regulations which could be a 1240 Mhz. uplink and 2340 Mhz. downlink or perhaps 3.3 or 5 Ghz. links. Earth Station TVRO and pirate MDS (2150 Mhz.) systems currently in use (don't tell me you bought one of those for "ham" use) could be used for "legitimate" satellite ATV use. Path loss, antenna "gain" are all within current technology. "How could such a system be put together?" Interconnection of present ATV repeaters, say from Washington, D.C. to Los Angeles is possible as local ATV'ers input a FSTV signal into their local repeater which has an "uplink" transmitter. The DX ATV user can either watch a secondary ATV repeater output (downlink) or directly monitor the satellite itself on his own receiving system (TVRO). Some sort of time sharing timetable would have to be employed using the "local" ATV repeater which would save wear and tear on the satellite. ATV'ers in non-repeater areas (who are use to self-made DX'ing anyway) would simply build up their own TVRO/transmitting stations. The satellite "footprint" could be continental or global depending upon the satellite equipment. Think of it, a "one" station in Maine working FSTV thru the satellite to a "six" station in San Diego! It is possible RIGHT NOW with current technology, to launch a satellite package in about 2-years which would already have antennas on board for coverage of our bands. We will need; transponder, baterry pack, share cost of photocells, and a control system. ASMAT folks would provide the expertise needed for actual construction of the satellite equipment. It is estimated that a 25-50 watt transmitter with half power option during periods of short daylight. The typical satellite lasts 3 years. The on board transponder would be limited to one signal at a time due to bandwidth. On-carrier sound is necessary for the audio reproduction that would accompany the TV video signals. Bandwidth would have to be reduced to about 2 Mhz. with only black/white possible. Color NTSC is not possible but color "under" systems such as with videotape recorders would be possible. An approximate 30 db carrier to noise ratio signal level could be delivered by the satellite to the user. (minimum 10 foot dishes and good preamps). It is anticipated that P4 pictures would be the rule of thumb. Three basic steps must be seriously organized as soon as possible: 1. Form a Satellite Committee and a fund raising plan to purchase and build equipment and to work with AMSAT and the Amateur ATV community. 2. Build the Satellite and "launch it into orbit! 3. "Use it!" I am willing to serve as "negotiator and liason" between ATV and AMSAT. I suggest "A5 Magazine" set up an escrow fund account and be in charge of "promoting" it all. I would like to hear from all of you interested in such a "fantastic" project that would turn a normally limited Amateur mode to a "worldwide" TV Video Communications System! Let's quit dreaming about it and do it!!!



A5 MAGAZINE EDITOR COMMENTS

Sound far-fetched? Not at all, and Henry is just the guy to get the ball rolling! A5 ATV Magazine pledges $500.00 as the first "official contribution". Let's hear your ideas and input. A5 Magazine will devote regular "space" to a ATV/Satellite Project. Write to Henry director via A5!

J. Vander Ryd VE3CYC
38 Audubon St. S.
Hamilton, Ontario
Canada L8J 1J7

A5 ATV MAGAZINE
"Feature Article"

REPRINTED with permission 73 Magazine (March 1982 Issue)
By Tim Daniel N8RK 2-26-82 and J. Vander RYD VE3CYC

* Readers who build the VE3CYC ATV project beginning on page 20 of this issue should include the following changes to make the converter more stable and less sensitive to antenna and feedline changes:

1) Install the MRF901 transistors from the foil side of the board.

2) Referring to Fig. 8 in the article, add a 68-Ohm resistor directly across the 440-MHz input cable on the circuit board. Solder one end of the resistor to the stripline near the center conductor of the coax. The other end of the resistor should be soldered directly to the circuit board ground foil.

Amateur Television's Stripper
—a home-brew star

CALL FOR ARTICLES

Are you a RTTY, SSTV, or fast-scan TV enthusiast? Share your knowledge and enthusiasm with the rest of us by writing an article about your favorite mode. We are planning several special issues for later this year, so get cracking. Send your submissions to: Editor, *73 Magazine*, Pine Street, Peterborough NH 03458.

(Ed. Note: For further information about this article, readers should consult the "Corrections" section of this issue.) *

Of the many different ways in which radio amateurs participate in our wonderful hobby, amateur television is probably one of the least understood by the general ham population and virtually unheard of by the general public. I am not referring to slow-scan TV, but to old-fashioned, regular fast-scan television.

Since I was actively involved in TV broadcasting about twenty years ago, in the days of black and white, I knew of the limitations involved. We used to pump out 16 kW of visual rf and about 10 kW aural and were happy to be informed that some viewers 40 miles away could still actually see us, which was not always the case. You can see that I was always very skeptical of the concept of amateur television. What was the point of proving that we could squirt a live picture a few blocks away? Big deal, right?

Now I am here to tell you that I, and anyone thinking along the same lines, could not be farther from the truth. About five years ago, one of our local club members found out that I was trying to build my own TV camera and talked me into experimenting with some simple ATV equipment. After puttering around for a few weeks and optimizing a 6-element yagi, commercial TV converter, and a ½-Watt, 6J6-type free-running modulated oscillator, we actually managed to work over a path of thirteen miles. We were so enthusiastic that we wrote articles to several club bulletin editors to mark this great local breakthrough. There was no turning back now. I proceeded to push ATV from then on by demonstrating at ham

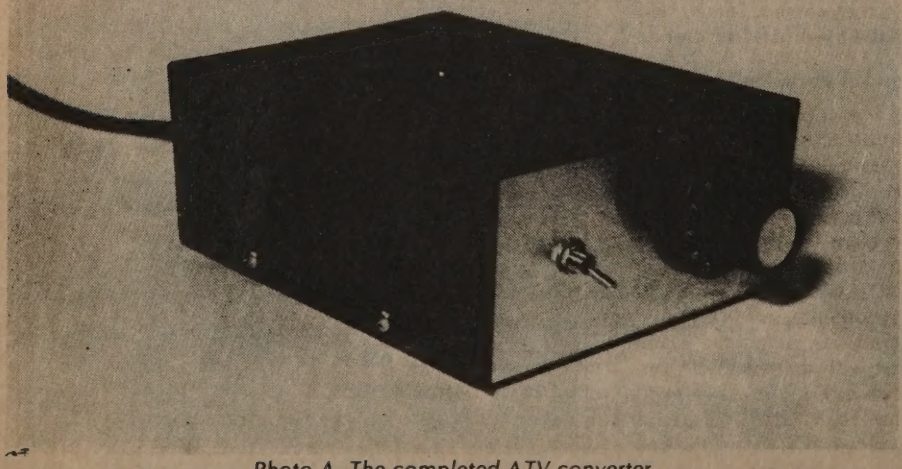


Photo A. The completed ATV converter.

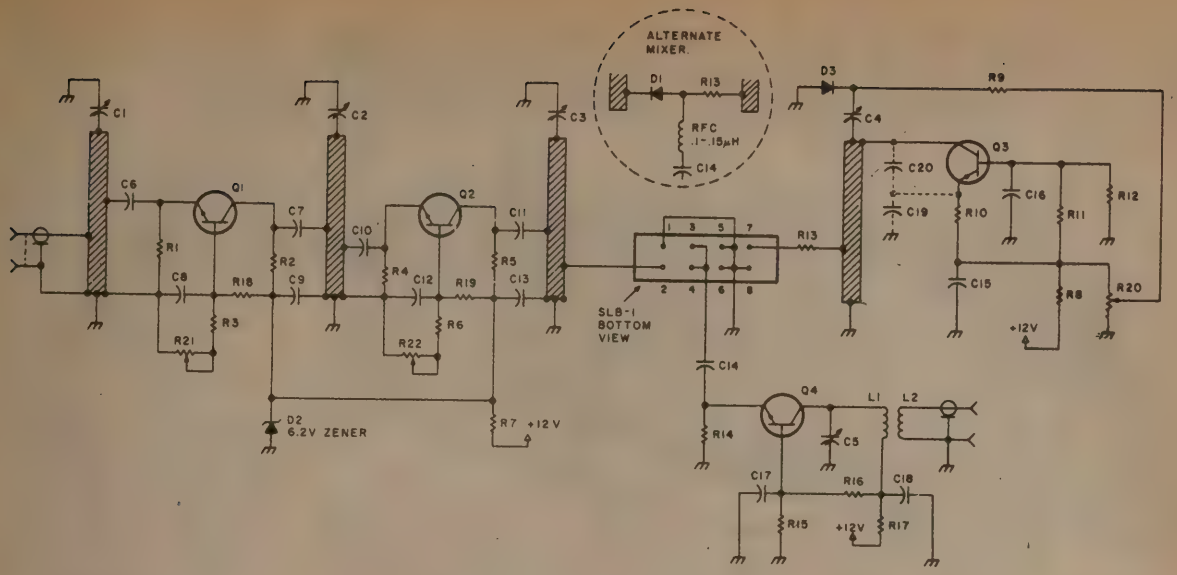


Fig. 1. ATV converter schematic.

clubs, hamfests, shopping malls, etc., and lecturing others on the pros and cons of ATV.

I have learned a great deal since that early beginning and, so, would like to pass on some helpful information to other hams who might want to follow in my footsteps.

First of all, ATV is not for everybody. I have seen many people come and go over the years. If you are not really that much interested in the workings of radio, from a scientific point of view, then forget it. Even if you buy all your equipment ready-made and get involved with your local ATV gang, you would soon lose interest because all they ever talk about and show you are ATV parts, circuits, theory, etc., until it comes out of your ears.

There are times when no one will be on, and that's usually when you want to demonstrate to your friends that you own channel 13½ and can do the same as your local station, only better. Other times, you may want to tune up your new preamp and find no one on; it can be frustrating. But there are times when another ATVer calls you on the land-line (or on 2 meters) and tells you that the band (70 cm) is wide open because the UHF TV stations are coming in like gangbusters. You will then drop whatever you are doing and get on the air right away, only to find out that all hell has broken loose on ATV—everybody and his brother seem to be coming in on a night like that.

You find yourself looking at a lot of co-channel interference, sometimes three stations at once. You turn your beam like crazy trying to separate them, while everybody is asking you via 2 meters to switch your transmitter on as well. You go bananas trying to videotape and play back, make pictures with your Polaroid, and keep track with your log sheets while simultaneously panning cameras, showing logos, etc. These openings occur more frequently than one might expect, depending a lot on your geographical location.

Around the Great Lakes region, we have a lot of thermal inversions. During the warmer weather from early spring to late fall, I can work W3POS in Erie PA at least a few times a week, and we are 85 miles apart.

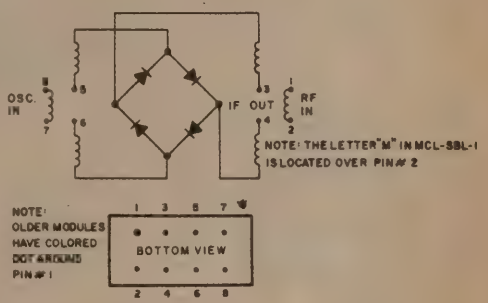

OSC. IN
IF OUT
RF IN
NOTE: THE LETTER "M" IN MCL-SBL-1 IS LOCATED OVER PIN # 2
NOTE: OLDER MODULES HAVE COLORED DOT AROUND PIN # 1
BOTTOM VIEW
1 3 5 7
2 4 6 8

Fig. 2. Double-balanced mixer hookup details.

Last year, I worked W9ZIH in Chicago IL, which is 420 miles away from me. I also have seen K9KLM and N9AB who are up to 440 miles away from me. (See December, 1979, *73 Magazine* Letters, p. 226, or November, 1979, *A5 Magazine* for more details.)

With my present setup, I can work stations within a 50-mile radius quite comfortably. I put out 50 Watts of rf on 439.25 MHz, with sound on the video carrier, into a compact skeleton-slot antenna. (See March, 1969, *CQ Magazine* for more details.) I usually can see a 10-Watt station quite well, providing he uses a good antenna system and is not located at the bottom of a pit.

In an attempt to see how low we could go, VE3QF in

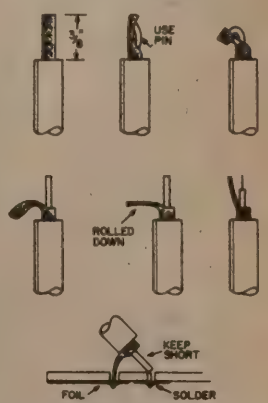


Fig. 3. RG-174 coax preparation and installation.

Toronto, Ontario, reduced his power to 50 mW into a set of four 27-element yagis and his picture frame would still lock in at my TV set. The picture quality was P1½ (P5 being absolutely snow free) and we were 50

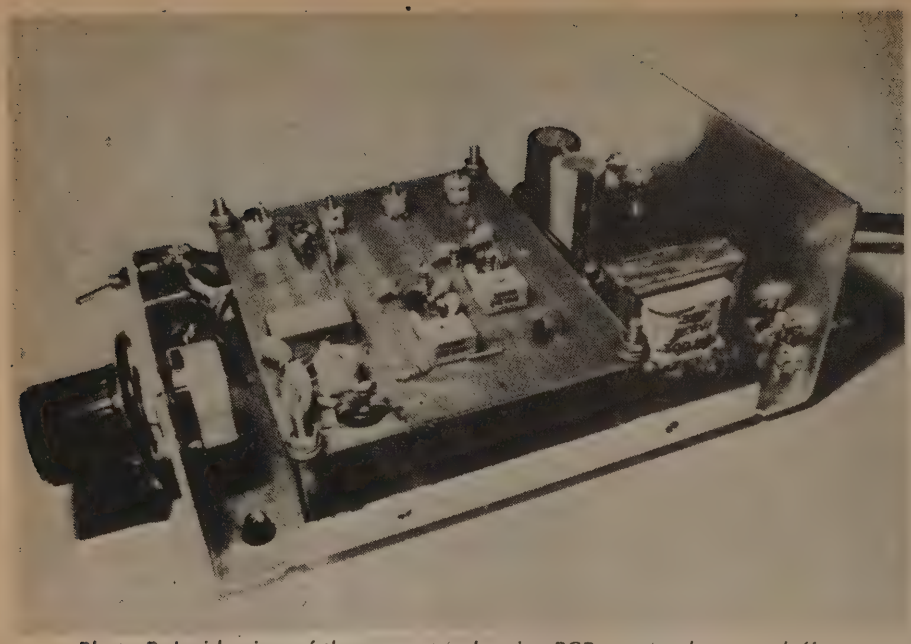


Photo B. Inside view of the converter showing PCB mounted on standoffs.

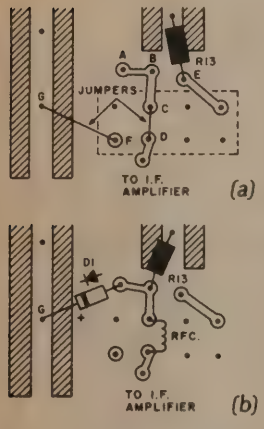


Fig. 4. Mixer installation details. (a) Double-balanced mixer. (b) UHF diode mixer.

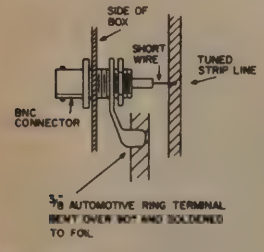


Fig. 5. BNC connector mounting.

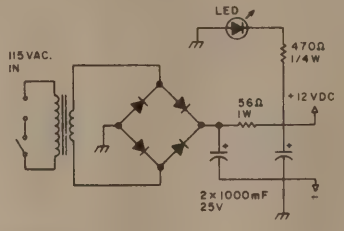


Fig. 6. 12-volt power supply.

miles apart. So, you see, with the converters, preamps, and antennas we use nowadays, ATV is really worthwhile. After all, a picture is worth *more* than a thousand words.

You, too, can do it, for it doesn't have to cost you an arm and a leg. If you are a newcomer to this TV game, make sure that there is local interest; find at least one other ATV fanatic. You will need at least one other person that you can count on for testing, adjusting, and fiddling with your video and audio equipment —it takes two to tango. Just two stations can keep busy for days, pruning and tuning. And when you drop that sharply-tuned converter, everything is out of whack again and you are set for another night of fiddling. When you've got a whole group on, you can take turns hamming it up making "Pink Rose Tea" commercials, putting on wigs or crazy caps with badges, and showing all your empty 807s.

As with any other mode of communication, the first thing to do is to be able to receive well enough. No point in playing around with old-fashioned UHF television converters, unless you are prepared to hang two or three preamps in cascade between it and the antenna. You can waste a lot of time this way and finally give up in disgust. If you can get ahold of a varactor UH tuner from a late-model TV set, you might be better off, although you still need additional amplification. Some of them will tune right down to 439.25 MHz and lower.

Unfortunately, the output frequency will only correspond with your TV set's video i-f frequency, which means you have to modify. Besides that, you do not take advantage of your TV UHF tuner's gain and selectivity. You also could build an ATV converter from various kits that are advertised in some ham publications, but my experience tells me that you will still need more amplification and selectivity.

Among the best preamps that I have built over the years were the ones that used tuned lines. The problem with them is that they are a bit tricky to make. You've got to be a combination of plumber and sheet-metal worker and you'll still end up with an amateuristic-looking contraption.

A couple of years ago (during a quiet ATV night), an idea came to me. Why couldn't I use stripline techniques instead of gas pipes and sheet copper? After all, they use it on rf power amplifiers for VHF and UHF. I decided to take one of my pet construction articles (see 1971 ARRL *Radio Amateur's Handbook*, page 417), of a 432-MHz preamp, and convert the tuned-line dimensions to stripline. I ended up with a printed circuit board that was a two-dimensional copy of the original three-dimensional preamp.

After I completed the new preamp, it took me a while to get things stabilized, but I got it working —surprisingly well, I might say. As a matter of fact, the results were so impressive that I supplied a number of ATVers in the area with similar preamps. I've made a few more since then, each time changing the dimensions a little bit; the objective was to make it smaller and simpler. Eventually it evolved into a complete converter.

The converter (Fig. 1) which will be described in

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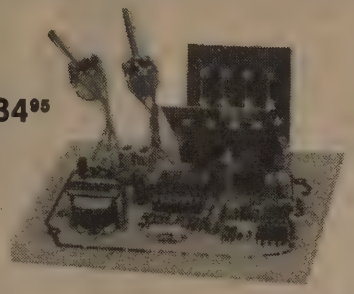
The squelch easily connects to the TV receiver audio stage without modification of the TV, since the squelch circuit contains its own audio output stage. You must provide your own speaker. Operator safety is provided by using transformer isolation between the receiver and the squelch circuit, thus eliminating the shock hazard when using a "hot chassis" type TV receiver.



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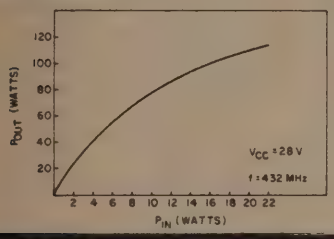
SIL-K Complete Kit—includes a detailed instruction manual, printed circuit board and all electrical components. Kit does not include case, speaker and regulated power supply (10 to 15 volts @ 250mA).
SIL-PCB Printed circuit board only. **$10.00**

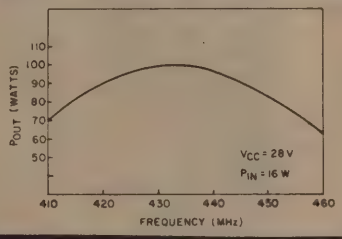
100 Watt Linear Amplifier

Now you can get on the air with a high power 100 watt class B linear amplifier for SSB-FM or ATV on the 420 to 450 MHz band and still not spend a lot. This kit is described in Motorola engineering bulletin EB-67 and is available in a number of configurations. For full output, a minimum of 16 watts is required for excitation with an input SWR of not higher than 2:1. Output will maintain stability with a 3:1 collector mismatch at all phase angles. A designed-in low-pass filter suppresses the 2nd harmonic to at least 63 dB down. An external power supply capable of providing 28 VDC, regulated, at 10 amps is also required.

$109.95

KEB-67-PK Kit includes detailed step-by-step instructions, printed circuit board, and all electronic components as shown.
KEB-67-PCB Printed circuit board **$14.00**
KEB-67-I Instruction manual only. **$5.00**





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P.C. Boards

The FCC does not allow us to sell Broadband RF amplifier kits in the HF range, therefore we can only offer the printed circuit board and parts on a piece-by-piece basis.
140 watt power amplifier as described in Motorola engineering bulletin EB-63. **EB-63-PCB**
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Transformers, transistors and other parts are also available.

We also specialize in hard-to-find components.

In addition to our kits, we also stock parts for other Motorola application notes and engineering bulletins. We have an in-depth stock of Motorola VHF and UHF transistors, Underwood metal clad mica capacitors (Unelco), Kemet chip capacitors, Cambion RF chokes and Ferroxcube Ferrite beads and RF chokes plus other difficult to find parts. If you are having trouble finding a part, call us, we probably have it in stock.

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this article is actually the seventh in the series, each one being an improved version of the former one. This one consists of two stages of rf amplification, one varactor-tuned oscillator, and one i-f amplifier. Also incorporated is a double-balanced mixer (more about this later!).

If you are not in the market for a complete converter, you might be interested in just copying the rf sections. Or, you might like to use the i-f (channel) amplifier separately between your own converter and boob tube for another 6 dB of gain. You also could use the oscillator as a self-contained unit to be used as an independent UHF signal source.

I will now describe each section individually so that you can take out whatever section you might be interested in. Later on in this article we will put it all together and make a complete, tunable, high-gain ATV converter.

The Rf Section

As I said earlier in this article, you can find the theory on this two-stage preamp in the 1971 and older *Handbooks*. Although we now use stripline, it seems to work basically the same way. In some earlier attempts, I used feed-through capacitors and even used separators between stages, as well as carefully-selected bias resistors. Even though I had the thing working, I didn't want to press my luck at that stage and try anything more radically different than what I had already done with the tuned-line (tubing)-to-stripline conversion. In more advanced models, we got rid of the feedthroughs (too expensive) and separators and even tried a whole range of replacement transistors. We finally settled on what we've got now; it seems to be the best, cheapest, and easiest way to go.

The rf amplifiers could be used as a one- or two-stage preamp. Both PCB layouts are provided so that you can take your pick. The one-stage job was carefully evaluated by Ralph W2RPO, using professional equipment. The test results indicated a 15.3-dB gain at 440 MHz, with a bandwidth of roughly 20 MHz between 3-dB points. Noise figure was not measured but is assumed to be close to the 1.7-dB mark, as the manufacturer of the MRF901 states. Even with the best modern TV UHF converters, a one-stage preamp like this one should make quite an improvement, at least another P unit, as we ATVers call it —maybe even two P units.

The two-stage preamp

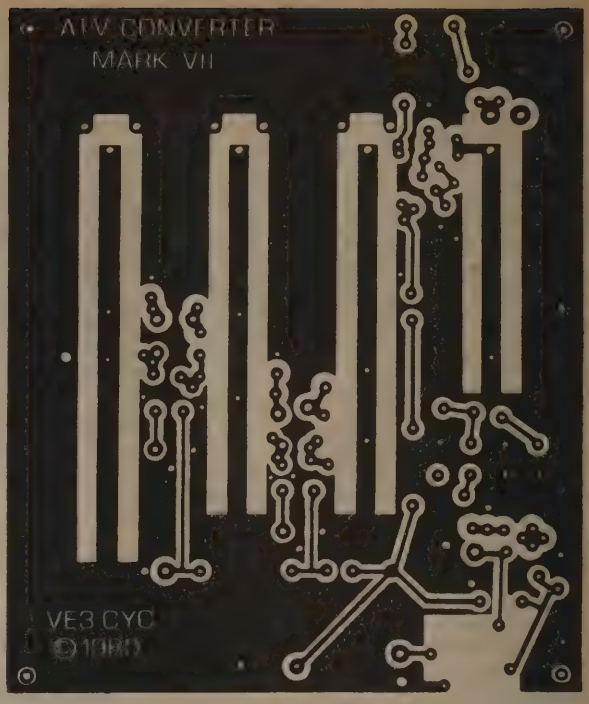

Fig. 7. ATV converter PCB layout.

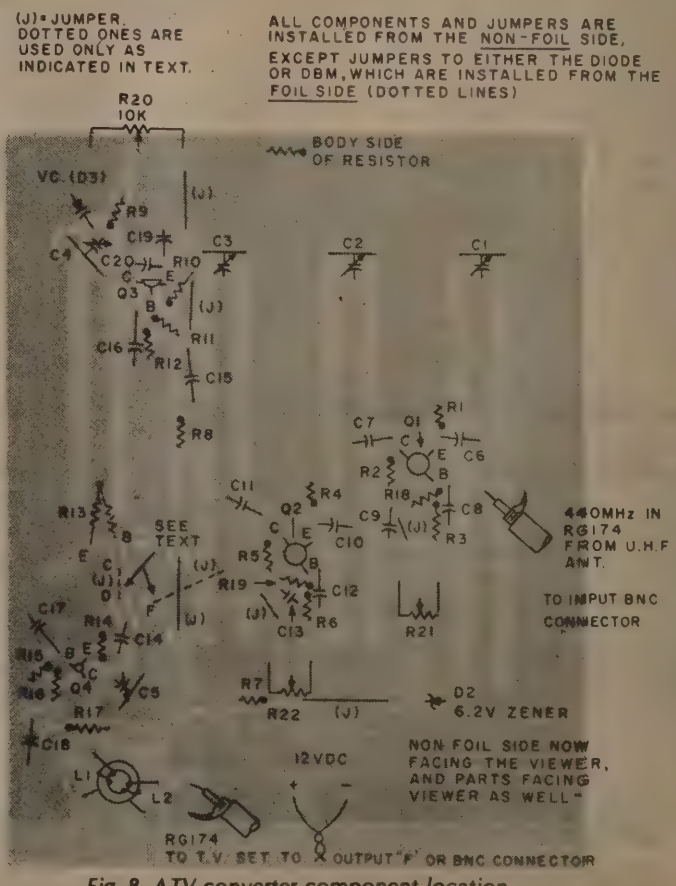
(J) = JUMPER. DOTTED ONES ARE USED ONLY AS INDICATED IN TEXT.
ALL COMPONENTS AND JUMPERS ARE INSTALLED FROM THE NON-FOIL SIDE, EXCEPT JUMPERS TO EITHER THE DIODE OR DBM, WHICH ARE INSTALLED FROM THE FOIL SIDE (DOTTED LINES)
R20 10K
BODY SIDE OF RESISTOR
VC. (D3)
SEE TEXT
440MHz IN RG174 FROM U.H.F ANT.
TO INPUT BNC CONNECTOR
D2 6.2V ZENER
NON FOIL SIDE NOW FACING THE VIEWER, AND PARTS FACING VIEWER AS WELL"
12VDC
RG174 TO T.V. SET TO "OUTPUT F" OR BNC CONNECTOR

Fig. 8. ATV converter component location.

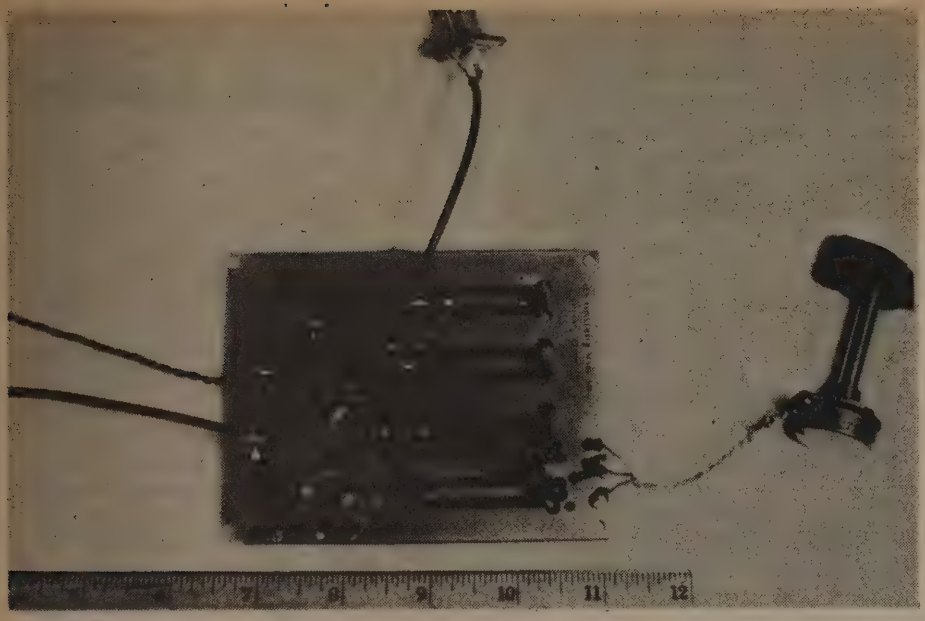

Photo C. Foil side view of converter with input, output, power, and frequency control connections.

will give about 40 to 50% more gain over the one-stage preamp. Therefore, you will have to decide whether it is worth the effort—it will make a day vs. night difference on those old tube-type converters like they used to have years ago—I can vouch for that.

I have dropped the 12 V down to about 6.2 V, which improves stability and keeps the noise figure down. You might try a higher voltage for more gain if you wish by changing the zener and dropping resistor values, but it will be trickier to tune up, especially when you live in intermod alley.

The Oscillator

It is not easy to make an oscillator work well with direct output in the 70-cm band. I had tried several schemes until I found this one. It originally had been developed by Tom O'Hara W6ORG, and it's used extensively in Tom's own products (PC Electronics). I have received Tom's permission to use his oscillator in this article.

Besides the change to stripline, I also changed a few values of parts, mainly to be more adaptable to other transistors (he uses the MPSH81) but also to keep the whole thing from radiating too much and getting into my scanner, etc. The two silver-mica capacitors, C19 and C20, are not always necessary with some transistors; the Sylvania ECG106 does a good job without them. These capacitors will lower the tuned frequency, and as a rule, the higher the value, the easier the oscillator starts and the less it drifts (try to keep the ratio about 1:3). If you've ever worked with regenerative UHF receivers, you might recognize the principles of this oscillator.

To preset the oscillator, it is best to set the 10k frequency control at mid range, clip a lead from a frequency counter to the output end of the 47-Ohm resistor (R13) and ground, and tune trimmer C4 to read 372 MHz for a 439.25-MHz video frequency in your area, providing your TV channel input would be channel 4. If you choose channel 3, your oscillator should be set at 378 MHz, and for channel 5 it should be 362 MHz, etc.

The carrier frequencies of channels 2, 3, 4, 5, and 6 are 55.25, 61.25, 67.25, 77.25, and 83.25 MHz, respectively. The sum of your chosen channel frequency and the oscillator frequency should be 439.25 MHz in this case, and correspondingly different for other ATV frequencies. If you don't have a frequency counter, you could use your TV set tuned to channel 59 or 60 and look for the second harmonic. The 1k resistor (R8) might have to be lowered if the oscillator fails to start.

I have tried several types of low-power PNP silicon UHF transistors, and most of them oscillate readily in this circuit. However, some have a tendency to drift more than others. The drift is not objectionable though, as it has to drift at least a few MHz to affect the video, which is seldom the case.

The I-f Amplifier

The main reason for the amplifier was to overcome the conversion losses in the double-balanced or the diode mixers, which is about 6 to 7 dB. The T37-2 toroid seems to be a better match than a T37-10 or T37-12 which I also have tried. The tuning is smoother and the tendency to oscillate has disappeared. The wire size is not critical; I have used #24 to #30 wire with equal results.

Fig. 9. UHF oscillator board PCB layout.

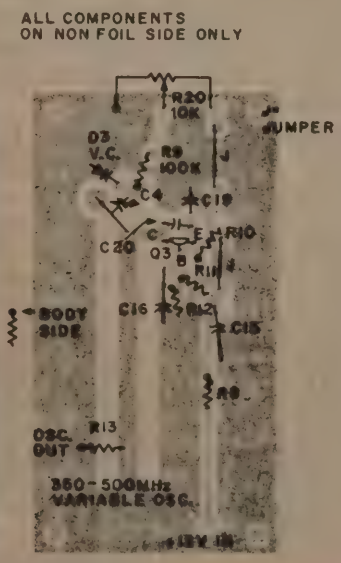

Fig. 10. UHF oscillator board component location.

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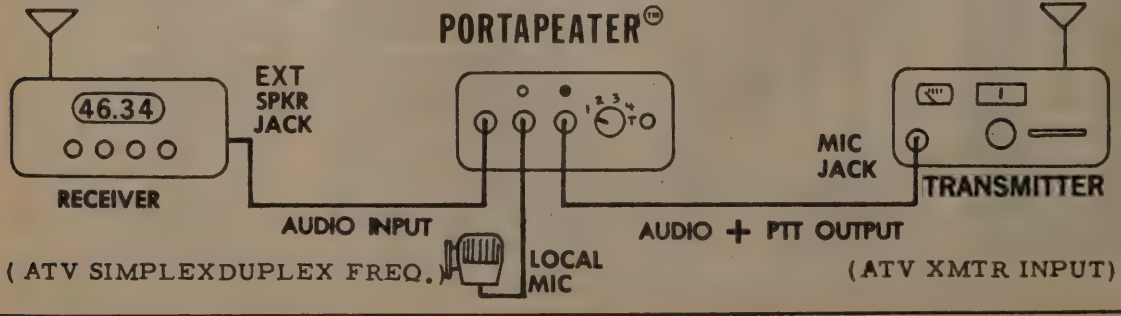
All M100A's include a highly detailed technical manual, with schematic, layouts, theory of operation, component data, instructions, and pages of useful experiment data for your own use. The M100A is housed in a custom made TEN-TEC cabinet.

Ease of mounting the PCB in the 100A is made possible by the use of a .156" 22 pin edge card connector layout.



This amplifier can be tuned up by hooking it to your TV set's unbalanced input (75-Ohm). On some older sets, you might have to go past the balun directly to the VHF tuner input. Apply power, clip a piece of wire to C14, and tune for the best picture on the channel of your choice or the next one, if the channel is blank. That completes the tuning.

The Mixer

When I started writing this article, the only mixer worth considering, in my opinion, was a double-balanced mixer (see *The Radio Amateur's Handbook* for details). The one I selected was the MCL-SBL-1 (see Fig. 2) for no other reason than availability. There is no question about it. They do a fine job in this circuit. But in small quantities they are rather expensive.

So, just for you cheapskates out there like myself, I included a makeshift mixer, which consists of two parts: a home-wound rf choke and a small-signal diode. How cheap can you get?

Despite its simplicity, this cheap mixer works very well. The conversion losses seem at least equal to if not less than the double-balanced mixer, but it is slightly more prone to intermod (at least when you live within a mile of FM and TV stations as I do). Nevertheless, it is a good substitute until you can get a double-balanced mixer—or you could use it permanently.

Construction and Tune-Up

The printed circuit boards are made of single-sided G10, 1 oz. copper-clad laminate. After you have obtained your board, either through your own efforts or otherwise, it is best to make sure that all parts have the proper hole sizes (i.e., #62—resistors and capacitors; #60—MRF901 transistors; #56—trimmer capacitors; 1/16"—coax braiding, etc.).

Place all trimmer capacitors and trimmer resistors in their respective positions. Some of these parts might not line up right away; you might have to bend the pins to fit them. These parts must be flush with the board before soldering.

Next, I would suggest that you install all the jumper wires. (Refer to the component location figures for positioning of all parts and jumpers.) Install all capacitors, chipping off excess material around the leads as may be required to place them flush with the board. Then install the resistors, leaving the 12-V side of R7 and R8 detached. Make sure that these are flush as well, as shown in the photos. Always install them with their bodies

Fig. 11. One-stage preamp board PCB layout.

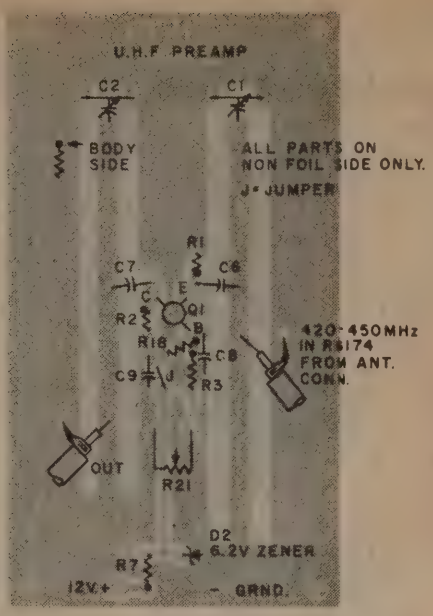


Fig. 12. One-stage preamp board component location.

Fig. 13. Two-stage preamp board PCB layout.

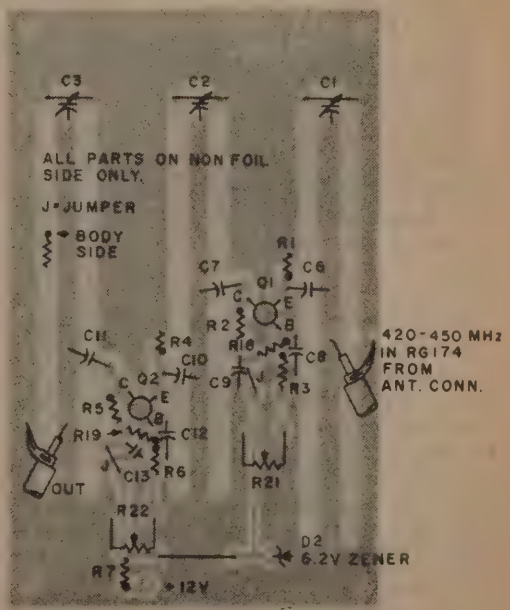


Fig. 14. Two-stage preamp board component location.

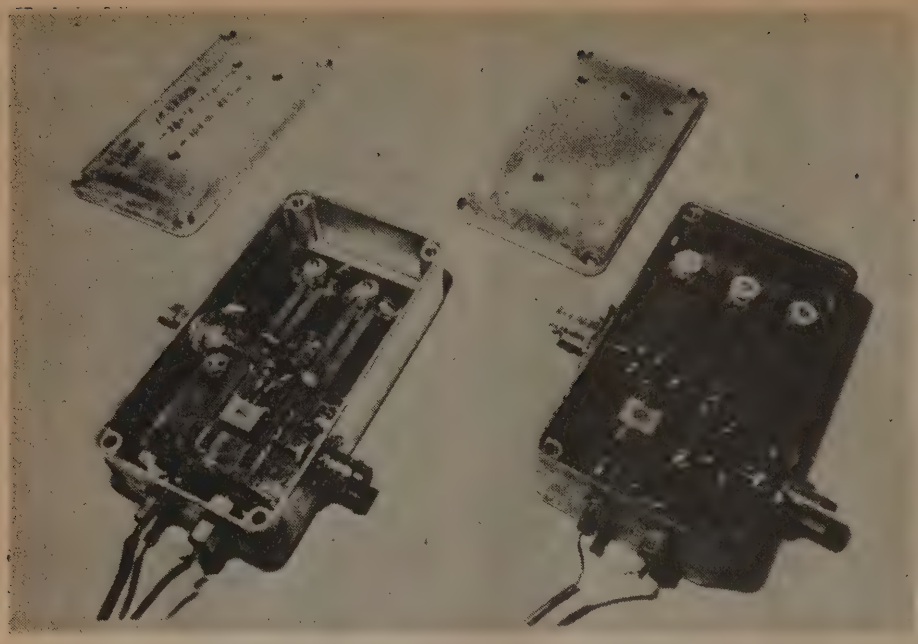


Photo D. Completed preamps in metal enclosures.

toward the rf side and leads toward the ground side.

Now install the transistors and diodes. Observe proper pin connections on the transistors and polarity on the diodes. Use a small soldering iron on this job and don't apply too much heat, as the copper foil may come loose. Never use a soldering gun on this kind of work—it might kill your transistors.

Install the remaining parts (toroid coil, rf choke, double-balanced mixer), then the power leads, three wires to the tuning potentiometer, R20, and the input and output cables from the board to the connectors. Make sure that the inner leads of each RG-174 cable to the board are as short as physically possible. A neat way would be to fish the inner lead with a pointed object through the side of the braided shield. About 3/8" from the end, roll the braided material to a smaller size between your finger tips, and solder in the ground hole as indicated in Fig. 3.

Normally, I would have included a couple of 1N914s back-to-back across the input for protection, but I skipped the idea, since it would just give you a false sense of security. Besides losing a little gain, I found it to be very ineffective when it comes to rf overload protection.

I have blown away a small fortune on replacement transistors in the process, despite the presence of the diodes. They even blew without any battery power hooked up every time I switched my 100-W linear on.

After throwing away my home-brew antenna relay (made from a conventional relay) and replacing it with a proper coaxial relay, my problems were solved. At this frequency, you only need a few pFs of stray capacitance between the relay parts to pass enough energy to knock that front-end transistor from here to the moon and further while the diodes just sit there laughin' at you. It doesn't seem to bother them.

Depending on whether you go for the double-balanced mixer (DBM) or the diode mixer, you will have to make some minor changes accordingly. Referring to Fig. 4(a), if you use the DBM, you will have to join C and D, hook R13 to E, and join G to F with a jumper wire as shown. Referring to Fig. 4(b), when using the diode mixer, join G and A with the mixer diode, D1, keeping the positive (banded) side on G, and hook R13 to B—that's all. *Make sure* to install the DBM from the component side of the board, and solder all 8 pins to the appropriate traces and ground connections. Note: To prevent C14 from accidentally shorting against the DBM, it might help to keep some clearance between the mixer module and the circuit board (about 1/16" will do).

I have used several types of diodes (silicon and germanium) and most of them seem to work quite well. A 1N82 UHF diode I tried seems to be a good choice. Hot-carrier diodes were disappointing in this circuit. You might try different ones yourself as most small-signal diodes work well in the GHz range.

In regard to the independent preamp boards (one or two stage), they should be installed in a metal box of some kind. I have used die-cast aluminum boxes for this purpose. The boards should be mounted away from the walls of the box as near to the center as possible by using spacers. If the box is small enough, you could possibly solder it right onto the BNC connectors as I did (see Fig. 5 and Photo D). Use a 0.001-μF feedthrough capacitor to feed 12 V in.

Preamp or Converter Alignment Procedure

While I explained the alignment of the oscillator and i-f amplifier earlier in this article, I will now proceed with explaining how to align the preamps and also the complete converter assembly:

1) Connect output to TV set, tune in your favorite i-f channel, and clip a length of wire to C14. Apply 12 V (Fig. 6, for example) to supply line and tune C5 for maximum on TV set.

2) Set R21, R22, C1, C2, and C3 to mid-range.

3) Tune TV to a low UHF channel that has a program on. Connect UHF TV antenna input to C10, R4, or Q2's input by spot-soldering a wire onto one of these spots. Connect a UHF antenna to antenna input on preamp or converter board. Hook a 12-V supply to R7 and ground.

4) Peak up C1, C2, and slowly turn R21 counterclockwise until a point of maximum gain is reached. If R21 is turned too far, the stage will break into oscillation; it should be kept just below this point.

5) Disconnect wire as installed in step 3, hook UHF TV's antenna to output of 2nd rf amplifier (connecting point to either D1 or SBL1, whichever is applicable), and peak up in the following order: C3, C1, C2, R22, and R21.

6) Repeat step 5 a few times until everything tunes smoothly. Be careful to keep R21 and R22 below the oscillating points. By now, you should notice quite an increase in gain on the UHF channel.

7) Tune oscillator as described under "The Oscillator" by applying 12 V to R8.

8) Solder R7 and R8 to 12-V line.

9) Peak up complete converter once more, step-by-step, to a distant ATV signal source.

10) After you close up your box or whatever metal housing you decide to use, you will have to touch up the adjustment a little to allow for detuning caused by the metal shield. If your box is the kind with slots in it, you could reach some trimmers with a narrow tuning tool, and after turning the shield half a turn, do the same with the remaining trimmers. In other cases you might accomplish this feat by using a temporary cover made from a tin can with some holes punched in it.

By now you should be able to pick up ATV stations 40 to 50 miles away, and hand out P4 picture reports, while others wonder how you do it; they only get a P2 picture or nothing at all. If you've got money to burn, you might want to use a $20 transistor in the front end with a 0.9-dB noise figure, but I wonder if you'll notice much difference.

Some Afterthoughts

If you run out of range on the 5k trimpots (R21 and R22), you could extend them by using higher values for R3 and R6. This might be necessary with some oddball transistors but if you stick with the types I mentioned, you should have no problems. If R3 and R6 prove to be too high, you can lower their values, but don't go below 220 Ohms. You won't have enough isolation between the trimpots and the rf-carrying parts of the transistor bases.

If you are interested in a wider range of coverage such as 427-444 MHz, it would be better to stagger-tune the stages a bit—439 MHz on the first rf stage and 434 MHz on the second stage for instance; this also will improve stability.

If you pick up signals that shouldn't be there while your box is closed, you might have to resort to a bandpass filter; there are some good designs in the *Handbook*, etc. I am working on one now that uses stripline techniques similar to the ones in this article. If successful, you might see it some day.

In regard to the varactor diode tuning arrangement, some suitable diodes can be found in surplus varactor TV tuners. Varactor diodes do not change capacitance in a linear response to a varying voltage, so don't expect your tuning arc to be linear with the oscillator frequency. The arrangement used here seems adequate, but you could alter the value of the tuning potentiometer, R20, and add series resistance to make the dial more linear. This, of course, will change with the kind of diode used. For instance, when R20 is 3k instead of 10k and you put a 6.8k resistor in series with the pot's ground leg and ground, your dial will cover about 6 MHz over its total arc (see Fig. 3).

You could make up a second board just for the oscillator to be used as signal sources. By carefully tuning, I managed to go as high as 500 MHz and as low as 350 MHz. When tuned to 439.25 MHz, it acts as a fairly stable low-power signal source ideal for tuning up UHF preamps.

My future plans include the development of a similar setup as described in this article, but for higher frequencies such as 900 and 1296 MHz. I am also presently working on a UHF TV exciter, intermediate amplifier, and linear amplifier, all solid state and stripline, of course!

I must thank the many Canadian and American ATVers who switched on their TV transmitters endlessly for long periods of time (which is hard on the tubes and transistors with small heat sinks and no blowers) just for me to tune up and try a newly-made preamp. And for their encouragement for me to write this article. Special thanks in this regard go to: VE3EJV, VE3CJP, VE3EYR, W3POS, W2RPO, and W2PBU.■

Parts List for Converter and Preamp Boards:

C1-4—.6-to-5.5-pF film trimmers (Phillips 010EA 5E) note #1
C5—22-pF film trimmer (Phillips 010EA 20E)
C6-14—0.001-μF ceramic disc capacitors, 1/4" lead spacing
C15-18—0.01-μF ceramic disc capacitors, 5/16" lead spacing
C19—5-pF silver mica (NPO) 3/16" lead spacing or axial leads, see note #2
C20—1.5-pF silver mica (NPO) 3/16" lead spacing or axial leads, see note #2
R1-8—1.k-Ohm, 1/4 W
R9—100k, 1/4 W
R10—470 Ohm, 1/4 W
R11—27k, 1/4 W
R12—10k, 1/4 W
R13—47 Ohm, 1/4 W
R14—330 Ohm, 1/4 W
R15,16—2.2k, 1/4 W
R17—100 Ohm 1/4 W
R18,19—4.7k, 1/4 W
R20—10k volume control (linear) Radio Shack #271-1715 or equivalent
R21,22—5k trimpots, Jim Pak #850P5K (Radio Shack #271-335, 10k, as a possible substitute only; requires one additional hole in board)
D1**—1N82 or equivalent high-speed, low-power UHF diode, or better
D2—6.2-V 1 W zener diode (1N4735), Radio Shack #276-561
D3—Varicap diode ±15 pF at 4 V (MV2205, MV2105, CGE-95, or equivalent
Q1,2—MRF901 transistors or equivalent NPN silicon UHF types
Q3—MPSH81, ECG106 or equivalent PNP silicon UHF types
Q4—2N2222
Rfc—approximately 0.1 to 0.15 μH (Cambion #2960-21-03-00) or wind your own: 10 turns #28 close-wound on 1/8" form or 1/2 W 100k resistor
Mixer*—Double-balanced mixer MCL-SBL-1 (made by Mini Circuits Lab, 2625 E. 14th. St., Brooklyn NY 11235; see '78 *Handbook*, page 306 for equivalents)
L1—5 turns of small gauge hook-up wire or #24 enamel wire on Amidon toroid T37-2
L2—3 turns same as L1
Miscellaneous parts: RG-174 coax cable, two BNC connectors, SPST mini toggle switch, LED, knob, hardware to mount board, and cabinet
*Only needed when not using diode mixer
**Only needed when not using double-balanced mixer (SBL-1)
Note #1: Transcap #24PX005 from Mouser Electronics could be used instead although you have to re-drill some holes. Similarly, Transcap #24PX020 could be substituted for C5.
Note #2: Plastic-film-type capacitors or even ceramics (NPO types) could be used as substitutes for the more costly silver mica types. Lower values such as 1 pF and 3 pF have also been used successfully.
All circuit boards, parts, built-up boards, and complete units are available from Spectrum Electronics. For price list and ordering information, write to PO Box 4166 Station D, Hamilton, Ontario, Canada L8V 4L5.

"AMATEUR TELEVISION MAGAZINE'S" 1982 NORTH AMERICAN FSTV-UHF CONTEST August 20 - 22, 1982

Over $750.00 worth of prizes will be awarded in the 1982 A5 Magazine "North American FSTV UHF Contest" to be held beginning at 6 pm. (EDT) on Friday, August 20th & concluding at 6 pm. (EDT) on Sunday, August 22nd, 1982. This 48 hour ATV Contest is designed for the UHF specialized communications operator to work as many FSTV contacts as possible with rewarding bonus "multipliers" and additions for "quality picture" transmissions, "DX distance accomplishments", and "bands utilized". All ATV stations in the United States, Canada and Mexico are eligible for entry. Even stations without transmit capability can participate utilizing a seconday frequency for voice confirmation of received "video". RULES AND GUIDELINES; (1) Contacts must be made on authorized amateur bands and within power limitations as set for by the governing agency. Transmission of TV signals in recognized SSB, EME, FM or Satellite portions of the UHF bands will not be recognized and becomes grounds for immediate disqualification of entry. (2) No station may claim another station more than one time per band. Crossband contacts are encouraged and authorized. Portable, mobile and air-mobile, etc. contacts allowable as long as verification of location and simplex transmission is used. Contacts via repeaters or any type of "relaying" device is prohibited. This is not to discourage ATV repeater use but merely to establish operator and station "self-accomplishment". Secondary "audio" frequencies for signal coordination are recommended such as 146.43 Mhz. FM, 7.290 Mhz. (40 Meters) and 3.990 Mhz. (80 Meters). Any locally utilized secondary "voice" frequency may be used. (3) For a valid contact to occur, verification must be established by both the receiving and transmitting stations. This can be accomplished by "video return", voice communications, hardcopy "photography" or letterred QSL. (Proof of contact to be included as logbook entry with required information or enclosed photographs to A5). (4) Video pictures transmitted must contain a minimum "station callsign" and "location" along with "signal report" of video received. Standard "P" signal reports will be used. (5) "Quality" multipliers, DX distance additions and Band useage multipliers will be used as detailed in figuring total scores per contact. Standard Air or Road Maps may be used to determine recorded distances. A circle "radius" should be drawn from the location of the operating station with increments of 25 miles with dot indications of stations worked. The map used must be submitted to the A5 Magazine "contest" editor" along with log entry information. AWARDS; Winners with the highest score in each ARRL Division District (1-Ø) (U.S.), Canadian Province or Mexican XE1, XE2, XE3 areas will receive a "free" one-year subscription to A5 ATV Magazine, one-copy of the new ATV book; "Everything You Always Wanted To Know About ATV* but were afraid to ask" and a "gold" Specialized Communication Achievement Award Certificate (suitable for framing). (All entries regardless of placement will receive a "gold" certificate showing participation.) The highest scoring North American "winner" will also receive a wooden plaque engraving with large orthodon video tube similar to the A5 Magazine "Good Image" award along with photo in A5 Magazine. (All entries are encouraged to send photos of station operation and contacts received and will be returned by A5 Magazine). Entries must be postmarked no later than September 1st, 1982 allowing one week for letterred verifications. Logs submitted shall be in the format sampled with readable information. Logs will be returned. Include A5 ATV Magazine subscription expiration date information with entry. Good luck!

BONUS POINT PROCEDURES 1982 A5 NORTH AMERICAN FSTV CONTEST

The "base points" awarded are determined by the "type" of video signal received, strength level, distance achieved and band utilized. The proper use age of best band propagation for the quality picture logged ensures all operators to strive for the best point score. Stations worked can only be counted once per band with the "best" contact claimed in point totaling. The FSTV point system is as follows;

TYPE OF VIDEO SIGNAL (basic scores)

1	1-way, verified sync or audio-tone bar display
2	2-way, verified sync or audio-tone bar display
3	1-way, audio sound detected only (subcarrier or on-carrier)
6	2-way, audio sound detected (subcarrier or on-carrier)
10	1-way, video picture (black-white) detected
15	1-way, video picture (black-white) detected with sound
20	2-way, video picture (black-white) detected
30	2-way, video picture (black-white) detected with sound
40	1-way, Color-picture detected
45	1-way, Color-picture and sound detected
80	2-way, Color-picture detected
85	2-way, Color-picture with sound

STRENGTH LEVEL RECEIVED (basic score times P-signal level)

Base times 1	P-0 to P-1 picture
Base times 2	P-2 picture
Base times 3	P-3 picture
Base times 4	P-4 picture
Base times 5	P-5 picture

(Refer to official G6NOX/G6KKD Signal Strength Charts)

DX DISTANCE ACHIEVED (Base score times P-signal "plus" DX points) *

25 - 25 miles	75 - 75 miles	125 - 125 miles	etc.
50 - 50 miles	100 - 100 miles	150 - 150 miles	etc.

(*use actual known miles such as 63 or 24 etc.)

BAND MULTIPLIERS (base times P-signal plus DX "times" band used)

1200 Mhz. (X2) 2300 Mhz. (X3) higher (X4)

Example; KAØBVT Moscow, Iowa works W9ZIH Chicago, two-way, BW, video only on 1260 Mhz. at P3 levels 180 miles. Their scores would be 20 (basic) X 3 (P) equals 60 plus 180 (DX) equals 240 times 2 (band) equals final score of 470 points.

Special contest "logsheets" are available from A5 Magazine (SASE). GOOD LUCK!

FAST SCAN ATV

ALL YOU NEED IN ONE BOX

Connect to the ant. terminals of any TV set, add a good 450 antenna, a camera, and you are there . . . Show the shack, home movies, computer games, etc.

FEATURES

- 10 WATT PEP OUTPUT ON SYNC. DC RESTORED MODULATOR. ADJUSTABLE SYNC. EXPANDER.
- STANDARD FREQ. AVAILABLE: 439.25, 434.0, AND 426.25 MHZ SPECIFY XMTR FREQ. AND DOWN-CONVERTER OUTPUT ON CHANNEL 2, 3, OR 4.
- BROADCAST STANDARD 4.5 MHZ SUBCARRIER SOUND WITH HIGHGAIN MIC AMP.
- 8 MHZ BANDWITH MODULATOR FOR HIGH RESOLUTION VIDEO, COLOR, AND COMPUTER ALPHA-NUMERICS.
- BUILT-IN REGULATED AC POWER SUPPLY.
- TUNEABLE DOWNCOVERTER COVERS 420 to 450 MHZ. CONTAINS LOW NOISE .9db NE64535 PREAMP, PLUS HOT CARRIER DOUBLE BALANCED MIXER.
- STILL $399 DELIVERED USA VIA UPS. TWO FOR $750, OR 5 OR MORE 10% OFF.
- SMALL 10.5x3x9

OPTIONS

- DM–1 RF/VIDEO DETECTOR MONITOR INSTALLED WITH BNC OUTPUT **$30**
- TWO FREQUENCY EXCITER INSTALLED WITH XTALS ON 439.25, 434.0, OR 426.25. NOT AVAILABLE WITH CA–1 . . . . . **$30**
- MIRAGE D1010 LINEAR AMP W/"N" CONN . . . **$299**
- SET UP TO DRIVE MIRAGE D1010 AMP WITH SYNC STRETCHER IN TXA5 ADJUSTED FOR 90 WATTS PEP **$20**
- PROVISION FOR EXTERNAL 12 TO 14 VDC FOR MOBILE OR PORTABLE **$30**
- ON CARRIER AUDIO MODULE CA–1 INSTALLED FOR THOSE AREAS THAT DO NOT USE STANDARD SUBCARRIER OR TWO METERS FOR AUDIO . . . **$50**

★ IF YOU WISH TO BUILD YOUR OWN SYSTEM, SEE THE BASIC 4 MODULE PACKAGE.

Our terms are Visa or Master Charge $25 min. by phone or mail, or check or money order $5 min. by mail. We do not believe in surcharging hams the cost of unnecessary paperwork from purchase orders, CODs and their returns from unhappy housewives, or unpaid invoices, or dealer markups. We try to give you the lowest price possible to promote Fast Scan ATV.

CALL OR WRITE FOR LATEST CATALOG AND PRICES!

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MAY 82 CATALOG OF PC BOARDS AND MODULES FOR YOUR COMMUNICATIONS SYSTEM

Solid State Fast Scan ATV Modules

CALL OR WRITE FOR LATEST CATALOG AND PRICES!

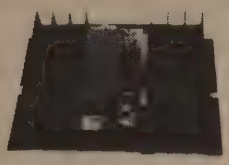
The Basic Four Modules

1. TXA5-4 ATV EXCITER/MODULATOR ..... **$89 ppd**

This wired and tested module is designed to drive the Motorola MHW-710 module in the PA5 10 watt linear amp. The crystal in the 100 mHz region keeps harmonics out of two meters for talk back. The video modulator is full 8 mHz for computer graphics and color. Requires 13.8 vdc reg @ 70 ma. Tuned with xtal on 439.25, 434.0, or 426.25 mHz. Built in sync expander.

Two Frequency Exciter ..... **$115 ppd**

Set-up with D1010-N 90W amp ..... add $20 ppd



2. PA5 10 WATT ATV POWER MODULE ..... **$89 ppd**

The PA5 will put out 10 watts RMS power on the sync tips when driven with 80 mw by the TXA5 exciter. 50 ohms in and out, plus bandwidth for the whole band with good linearity for color and sound. Requires 13.8 vdc regulated @ 3 amps. MHW-710-2 ..... **$60 ppd**

3. FMA5 AUDIO SUBCARRIER GENERATOR ..... **$29 ppd**

Puts audio on with your camera video just as broadcast TV does at 4.5 mHz. Puts out up to 1 v p-p to drive the TXA5 or VM-2, 3, or 4 modulators. Requires low Z mic (150 to 600 ohms), and +12 to 18 vdc @ 25 ma. Works with any xmtr with 5 mHz video bandwidth.

4. TVC-2 ATV DOWNCONVERTER ..... **$55 ppd**

Stripline MRF901 (1.7 db NF) preamp and double balanced mixer module digs out the weak ones but resists intermods and overload. Connects between uhf antenna and TV set tuned to channel 2 or 3. Varicap tunes 420 to 450 mHz. Requires +12 to 18 vdc @ 20 ma.

Super sensitive TVC-2L with NE64535 preamp (.9db NF) stage . . . **$69 ppd**

TVC-4 ATV DOWNCONVERTER ..... **$89 ppd**

This is a packaged version of the TVC-2 converter with internal power supply. Has BNC input and F output connectors.

Also available with the NE64535 (TVC-4L) ..... **$105 ppd**

Size: 5 1/4 X 2½ X 7 inches.

♦♦♦♦♦♦♦♦♦♦♦♦♦ Package Specials ♦♦♦♦♦♦♦♦♦♦♦♦♦

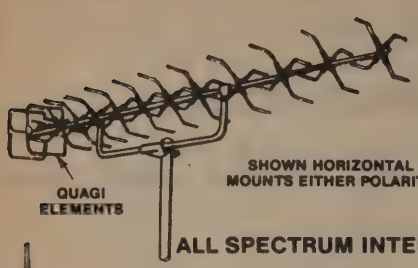
TXA5, PA5, FMA5, and TVC basic module package ..... $249 ppd

OPTIONS:
- 2 frequency exciter ..... add **$26**
- NE64535 low noise downconverter ..... add **$15**
- Packaged TVC-4 downconverter ..... add **$34**
- Magnacraft W120X-14 coax relay ..... add **$41**

10% discount on 5 or more of one module ordered at one time to one address.

5-82

J Beam MBM48/70cm ANTENNA ..... ONLY *$75.75



One of the few antennas that have enough bandwidth for ATV... 3 db down at 420 and 450. Covers simplex and Repeater frequencies with no sacrifice. No balun to buy.

- **15 dbd. 48 elements.**
- **6 foot boom length.**
- **Direct 50 ohm coax feed.**

*cod or charge card only due to added UPS shipping charges

mbm88/70 88 element *$105.50
pmh2-70 dual phasing harness .....*$ 16.65
mf2-48 vert stacking frame.....*$ 14.00

ALL SPECTRUM INTERNATIONAL PRODUCTS CAN BE ORDERED THRU P.C. ELECTRONICS

LOW LOSS COAX.

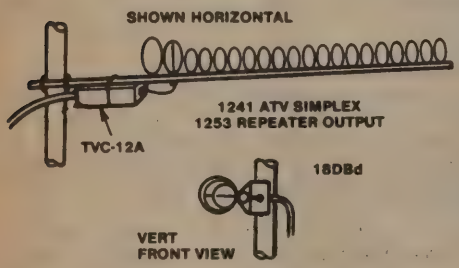
50 ohm Saxton 8285 foam RG8 type ..... 100 ft roll . . . **$41 ppd**
Only 3.5 db/100' loss at 400 mhz. Tight 95% shield. Other lengths 45 cents/ft + $5 UPS.

AEA 450 ISOPOLE OMNI GAIN ANTENNA ..... $65 delivered.

High efficiency decoupling cones puts the all the RF on the horizon where it counts. Great for local ATV round tables, or public service portable work, separate sound subcarrier transmitters, FM remote base and repeaters. Ready to connect to your coax N connector and 1¼" mast. Low wind loading and DC grounded for ruggedness.

1200 MHZ ATV SYSTEMS

Use 1278.75 mHz as a duplex atv freq. with others on 439 or 434 mHz by just adding a MMV1296 varactor tripler and 1296-LY loop yagi to your 10 watt transmitter on 426.25 mHz. As long as the 400 and 1200 mHz antennas are more than 5' apart no special filters are needed. To receive just add a 1296-LY loop yagi and the TVC-12a downconverter. Other uses are crossband repeaters to see your own video comming back, repeater links and remote bases, weather radar video, site security, etc.



TVC-12a 1215 to 1300 mHz DOWNCONVERTER .... $89 ppd

Sensitive NE 64535 preamp stage, remote varicap tuned, downconverts to TV channels 7 or 8. Mounts on 1296-LY antenna to save feedline losses. Requires simple 11 to 18 volt at 20 ma supply made from Radio Shack parts to tune thru IF coax line.

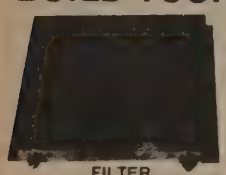
1296-LY LOOP YAGI ANTENNA ..... *$64.70 + UPS

18 dbd gain and full bandwidth on a 7 ft boom. With N connector.

MMV1296 VARACTOR TRIPLER ..... $113.45 ppd

Triples ATV, AM, or FM to the 1200 mHz band with 60% efficiency. 20 watts max drive, and no power supply required.

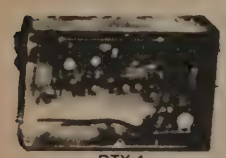
BUILD YOUR OWN ATV REPEATER WITH THESE BASIC MODULES:


FILTER

PSF438-ATV INTERDIGITAL VESTIGIAL SIDEBAND FILTER ..... $131.50 ppd
5 mHz bandwidth for good color and sound but rejection for no desense. Copper plated 7 pole for typ 1.3db insertion loss.

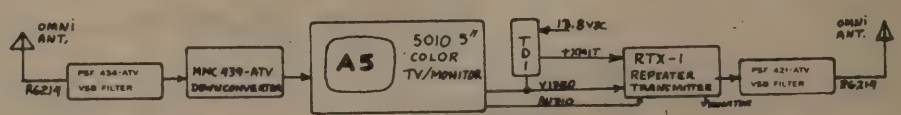
MMC439-ATV CRYSTAL CONTROLLED DOWNCONVERTER ..... ch3 IF . . . $78.45 ppd
. . 45.75 mHz IF 83.45 ppd. Low noise MRF901. 30 db gain.

5" LIBERTY MODEL 5010 PORTABLE COLOR TV/MONITOR..... $299 ppd


RTX-1

TD-1 TONE DECODER. Detects horizontal sync to key xmtr..... **pc board $5.**

RTX-1 ATV REPEATER TRANSMITTER MODULE ..... $325 ppd
Contains sync equalized TXA5 exciter, FMA5 sound subcarrier, MHW710-2 10 watt power module, and DM-1 Detector/Monitor in a shielded diecast aluminum box.



SEND SASE FOR COMPLETE REPEATER INFO including ready to go ATVR-4 for $2499, adding special effects, mixing two meters, getting rid of desense and interferance from other transmitters at the same site, etc.

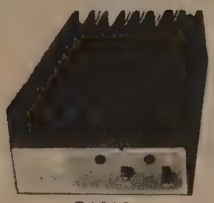
P. C. ELECTRONICS 2522 S. Paxson Ln. Arcadia, CA 91006 (213) 447-4565

GP-41D

LIMITED HOT BUY

HITACHI GP-41D TRI-ELECTRODE PORTABLE COLOR CAMERA.....$490.....~~$690~~ppd

6:1 power zoom 14-84mm, auto iris, F1.6 lens with macro focus for close-ups. 1.5" electronic viewfinder. Boom microphone. Full range variable color temperature control. Superior color and low light sensitivity to 75 lux. 12vdc (6.7 watt load) to 117vac adaptor, AP-4 ..... NC



D1010

DM-1

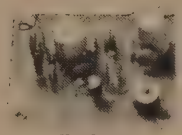
D1010-N MIRAGE ALL MODE 100 WATT AMPLIFIER....$299ppd

420 to 450 mHz, FM, SSB, CW, and ATV. Up to 90 watts pep on ATV with only 4 watts drive. Req. 13.8 vdc reg. at 20 amps. Uses "N" connectors. 12" x 3" x 5½". Specially modified by us for ATV.

DM-1 RF/VIDEO DETECTOR & MONITOR.....$20ppd.

Samples RF off xmtr coax and outputs 1 v p-p video to monitor your own camera and setup. Also outputs to a external 50 uA meter for relative power. Req. +12 to 18 vdc at 25 ma. PC board only .....$ 5ppd.

TVG-1



TVG-12

TVG-1, TVG-12, $15ppd & TVG-23 ATV TEST GEN. ...$20ppd ea.

Connect your camera and you have about one milliwatt on the air for demos, ant tests, or receiver alignment. Req. 9vdc at 7 ma. TVG-1 tunes 400-480 mHz, TVG-12 tunes 1200-1300 mHz, and TVG-23 setable 2.1-2.5 gHz.

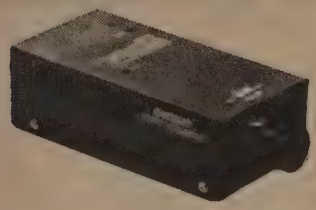
TSQ-1 TV S-METER AND SQUELCH BOARD $5ppd

Add common or Radio Shack parts, tap into TVs video IF AGC line, break one speaker lead, and you can better align the antenna, give relative signal reports, and have no noise between contacts.

TVX-1 TELEVISION TRANSMITTER $500ppd

This is a complete 10 watt UHF TV transmiter in a 3½" high 19" rack panel intended for community television outside the USA or ATV in USA. Takes baseband video and line level audio input from a TVRO, VCR or camera. Also a mic input for voice overs. 117vac 60 hz supply. Video monitor output. 4 to 6 week delivery depending on frequency. Standard atv freq 434, 439.25 & 426.25 avail.

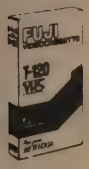
UHF TV channel 14 thru 20 (export only).....$600
VHF TV channel 7 or 8 (export only).....$750
240vac 50 Hz supply add $50. 8 Lbs. Call for details.



HITACHI HV-62U BLACK AND WHITE CAMERA $205ppd

High performance CCTV camera great for ATV or surveillance. 500 line resolution, 10,000:1 auto light compensation. C mount 16 mm F1.6 lens included. 117 vac at 7 watts. small 4 x 2. 7 x 8 inches.

HV-62SU externally syncable, 2:1 interlace version.....$299ppd
WIDE ANGLE LENS HF-9A 9mm F1.4 C-mount.....$75ppd
TELEFOTO LENS HF-35A 35mm F1.7 C-mount.....$75ppd
ZOOM LENS H5X14C 5:1 14-70mm F2.0 C-mount.....$204ppd



ATV DEMO VIDEO TAPE.....VHS FORMAT.....$25ppd
This tape is directed toward radio club meeting programs, or groups contemplating getting on ATV. The 21 minute running time shows on the air contacts, equipment, public service uses, voyager 2, and more. If this tape doesnt get your buddies on ATV with you, then nothing will!

P.C. ELECTRONICS is your one stop ATV supplier. As an ATVer for over 20 years, full time business for 4 years, we know what you want. Fast service, state of the art, reasonable prices. We normally ship within 2 days of receiving your order for our equipment if payment is postal money order or charge card. Original designs using latest technology.

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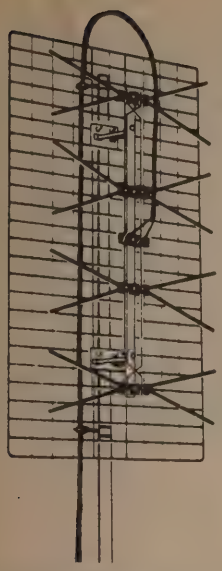
MORE FAST SCAN ATV "DX-TIPS"

By WB0QCD



4-Bay Bowtie

Helpful hints for us newcomers on FSTV can sometimes make the difference between "making the contact" or missing it. The largest problem on UHF-ATV today is not really loss in transmission lines, improper connectors or even different antenna polarizations; It's "knowing when the band is up" and "getting ATV stations alerted and "on-the-air" to take advantage of the openings! A separate UHF TV antenna system (rotatable) that can monitor channels 14-82 in the commercial TV band, is the answer. I picked up one of the 4-bay bow-tie dipole antennas manufactured by Winegard Industries located in Burlington, Iowa (available at just about any TV dealer especially in UHF-TV areas) for a $20 bill at a January "hamfest". It took me awhile to get it mounted in May when the tower needed some maintenance work just in time for the DX season. The antenna can easily be mounted over any stacking kit structure or on any vertical mast pipe (two supplied U-bolts). There are of course other types of high-gain UHF-TV antennas such as multi-element beams cut for specific portions of the band. Check your local area for a couple hundred miles for activity placement. If you are an antenna "builder", the demensions of the Winegard array are shown in the April Volume 12 #4 issue. The very next morning, I checked the system out (0630 am.) and saw channels 15, 17, 19 (WRAU-TV) central Illinois, 20, 21, 23 (Rockford, Ill.?), 25 and 31 (Peoria, Ill.), 27 (?), 32 (Public Broadcasting in Waterloo, Iowa) and 40 in Dubuque, Iowa. Most of the stations ranged anywhere from 60-150 miles with 19, 23, 31, 32 and 40 of P-4 signal strength! Both video and audio were received by most of the stations. Even channel 3 came in on my "home TV set (WCIA-W49AA Champaign-Springfield, Ill.) with color bar pattern and tone signal. It is a commonly known fact that the early morning hours between 5-8 am. produce the "best DX" conditions on a regular basis on the UHF bands. Accordingly, late evening hours will also bring results with occasional summer "openings" during the daylight hours of great intensity. The ATV-DX'er "must" know when these conditions are occurring and what better way than to "monitor the actual frequencies near where we work. The diagramed chart shows carrier frequencies in relation to TV channel designations. As you see some of the stations higher up in the spectrum, this means the band is even "stronger" in the lower portions. Reception of the sound subcarrier signal means the band is usually up. Get something up in the air and watch that UHF-TV!

CH	FREQ. RANGE IN MHz	CARRIERS IN MHz		
		VIDEO	COLOR	SOUND
UHF	470-890	–	–	–
14	470-476	471.25	474.83	475.75
20	506-512	507.25	510.83	511.75
27	548-554	549.25	552.83	553.75
35	596-602	597.25	600.83	601.75
42	638-644	639.25	642.83	643.75
50	686-692	687.25	690.83	691.75
60	746-752	747.25	750.83	751.75
70	806-812	807.25	810.83	811.75

1st Annual Lunar-Letter "Meteor Scatter" Contest August 11-15th, 1982

Winners

. Top Scorer All Bands
. Top Scorer 50 Mhz.
. Top Scorer 144 Mhz.
. Top Scorer 220 Mhz.
. Top Scorer 432 Mhz.

Points

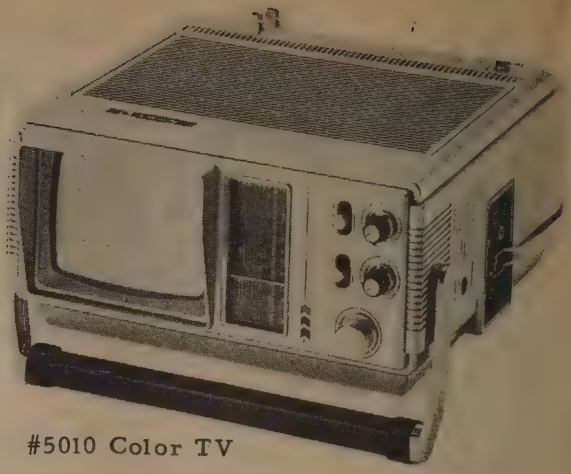
50 Mhz. - 50 points
144 Mhz. - 10 points
220 Mhz. - 100 points
432 Mhz. - 1000 points
Above - 1000 points

. Multipliers used
. QRP "bonuses"
. 50.120 Mhz. above
. 144.150 Mhz. above
. 220.100 Mhz. 432.100

Prizes! Prizes!

For more information, contact Bill Canton - KI7D c/o Lunar Letter
312 12th Avenue South, Nampa, Idaho - 83651 (or K4PKV Dick NC)

DAYTON, OHIO HAMVENTION
PART TWO
by WB0QCD



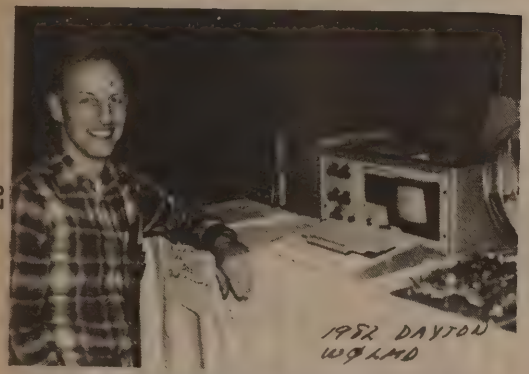
#5010 Color TV

Our June Volume 12 #6 issue reported what happened with SSTV at the 1982 Dayton, OH Hamvention. Part #2 deals with primarily FSTV displays at the "world's largest" ham-fest that officially drew some 23,000 amateurs from all parts of the world. The doors opened at noon on Friday, April 23rd to the Hara Ex-position Center and the commercial booths. One booth that was constantly busy with buyers and onlookers was that of PC Electronics and well known ATV'ers Tom O'hara W6ORG and his lovely wife Mary Ann WB6YSS. PC showed off their "new" 2300 Mhz. FSTV test transmitter board as well as their distributed low-price "Liberty" line of Color TV's. The model #5010 (pictured above) is a very lightweight, 3-way powered (AC, DC or bat-teries) tunable 5" Color TV receiver that has 3-ranges of tuning for low-VHF, hi-VHF & UHF channel signals. The "unique" feature about the model #5010 is that it has separate input jacks and switches for interfacing a videotape recorder and a great video and audio output tap for easy withdrawl of video that can be used for FSTV transmitters or SSTV camera input injection for frame storage techniques. A slide switch selects 300 or 75 ohm inputs with all the necessary picture controls conveniently mounted on the side of the set. The color pictures at Tom's booth off the Liberty TV looked great and I couldn't resist not getting one. I have it hooked up now in the shack and it performs flawlessly with sur-prisingly great color. Sensitivity seems to be as good as my hot 12 inch Samsung black-white ATV receiver which means I can now see "color ATV"! Interfaced with my VCR, I now can directly send a clean "regenerated" color TV signal from my recorder-thru my TV and into my ATV transmitter (it's also a handy way to show others on FSTV what UHF TV signals look like for band propagation tests.). This was certainly a great addition to the PC Electronics line of ATV equipment and for any of you out there building up an ATV Repeater-the Liberty #5010 is ideal for your color video relaying processor. Science Workshop booth #96 was right next to us at A5. Murray and wife Lee displayed two "new" ATV devices; a surplus-tuner circuit that makes an ATV downconverter receiver tunes from 420 to way above 900 Mhz!! An additional "bonus" is that it receives on-carrier sound as well as sub-carrier. For those of you using on-carrier sound monitoring, this kit would be a great way to do all things at once (see ad). Their "Poor Man's Spectrum Analyzer" sold out with many putting their names on the reserved list for the next ship-ment of the popular "kit" project. Science Workshop has long been recognized as unique for taking surplus projects and turning them into workable systems for amateurs. A bit further down "video-row", Communications Concepts displayed their ATV "squelch-audio" kit for $29.95! Nobody likes to listen to the noise from the ATV-TV set during non-activ-ity and this little device squelches the noise until someone else comes on the air. The Dayton, Ohio based firm is well known for their linear amplifiers and other specialized equipment. The Saturday 2 pm. ATV forum lasted over 2 1/2 hours. During my FSTV talk I asked for a show of hands of operators now on the air on ATV and 3/4's of the room displayed feedback! Henry Ruh was awarded the 1981 "Good Image Award" along with Britisher G3NOX and South African ZS6BTD for SSTV accomplishments. Next year at Dayton promises more "get-togethers" for FSTV'ers and an even more exciting show!

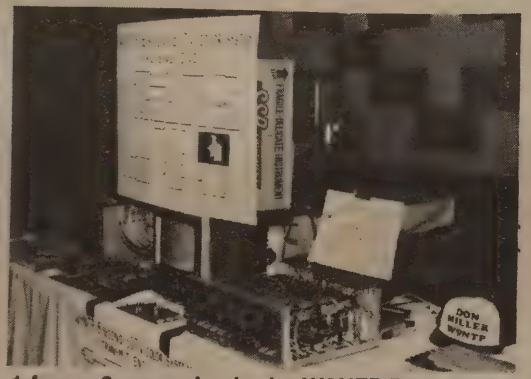
Jim Schueckler WB2YZL Digital SSTV

Syo Horne VE3EGO Colorscan 403

George Steber WB9LVI Microcraft SSTV



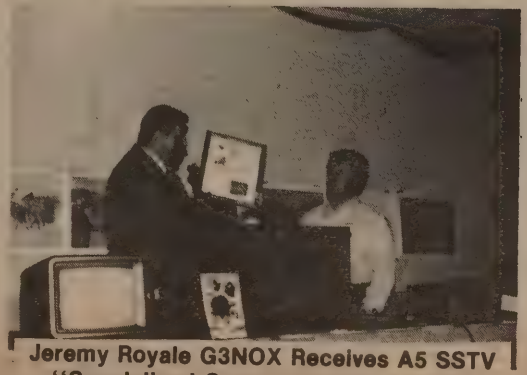
Robert Suding W0LMD "Micro" SSTV



1 frame 8-second color by W9NTP Don Miller

3 Generations of A5 Magazine
Ron Cohen, Henry Ruh & Mike Stone

Henry Ruh KB9FO "1981" A5 Good Image Award"



Jeremy Royale G3NOX Receives A5 SSTV "Specialized Communication Award"

WB0QCD gives FSTV Talk at ATV Forumn

"PHOTOS COURTESY OF DON MILLER W9NTP, WALDRON, INDIANA"

EDITOR: Response on this series of articles has been so great we asked GERARD to "Keep Them Coming.' (More TVRO articles will follow No. 7 in September.)

ALL ABOARD TVRO

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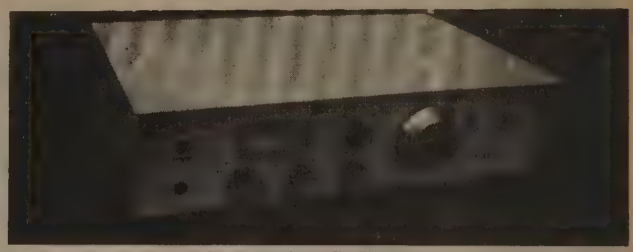


ALL ABOARD TVRO
How to Build Your Own Satellite Receiver.

Since the individual modules has seperate regulators, providing DC power should be a simple task. In my original construction I incorporated seperate power supplies to power to "upstairs" unit and the "downstairs". The upstairs unit consisted of the 1st LO, 900 Mhz. I.F., the 970 Mhz Osc., the 70 Mhz I.F. and the LNA. I ran 20VDC up a pair within the 8 cond rotor cable, along with the TUNE line and 4 rotor control wires. When I positioned the dish antenna, I moved everything up on the roof, where I used short jumpers to tie the system together. After we had the dish locked into place, I moved everything back downstairs, only to discover a huge bar across the screen. Yes, I had managed to acquire a ground loop, and I tried everything to get rid of it, only to wind up discouraged. After many failing attempts of different combinations, I discovered that operating only ONE power supply was the answer. So I built a healthy 3 amp 20 volt supply that runs everything, including the RF modulator. Remember that all those regulators, (I have ten of them total) draws a bit of idoling current, so you want plenty of reserve current available. If you don't have enough filtering on the 20 volt line, you may wind up with 60 Hz getting in and causing the picture to roll.

I arranged the power supply so that the LNA and upstairs unit are always on. The unit downstairs is shut on and off, but I make sure that the 1st L.O. tune line remains on always, by keeping power applied to the DC control board.

Power supply should deliver somewhere between 18 to 22 volts DC with all circuits in operation.

One comment I wish to add, after receiving many cards and letters; If you are unable to successfully construct the 1st article, don't bother to continue to the other articles. This project is not for the beginner, for it demands a lot of careful attention, not to mention dollars. I would hope that you would know of someone who has a TVRO receiver, so that you might be able to try yours out before attempting the LNA or dish antenna. As a double check, your receiver will probably work the first time if you do the following: 1. Audio board. You should hear 40 meter activity and foreign broadcast "slurred" together if you connect to a 40 meter or long wire antenna. 2. Demodulator board. You should be able to measure 70 Mhz with a frequency counter on the VCO test point. Inject a video signal (a camera works super) to pin 14 of the NE564. Look at the signal at the VIDEO OUT, (a monitor works fine) you should get a signal like the one you put in. Note you should reduce the level of input to pin 14 by inserting a pot or attentuator, so not to over drive the circuit. Next change the vid. polarity switch and see if it works. If you fail to get a signal through, try injecting the video at pin 14 of the NE592 video amp. Check to be sure pin 5 is grounded on the 592.

3. 70 Mhz I.F. This one has to be swetp, and should have the proper gain and bandwidth. Some have been setting the bandwidth narrower (25 Mhz) and getting good results. Gain is automatic because of the MWA120 amplifiers, so this shouldn't be a problem.

4. 970Mhz osc. Use a prescaler along with your frequency counter and you should have no difficulty. The fourth harmonic (3880) Mhz shielding is a must from the input mixer, or you will wipe out one or two channels.

5. 900 Mhz I.F. Set piston caps midway, and you should be able to get something. This circuit is broadband, and easy to adjust on the air. Tweek all four several times, with the AFC turned off.

6. DC control board should be checked for voltages at various points as necessary. This one is hardly worth mentioning.

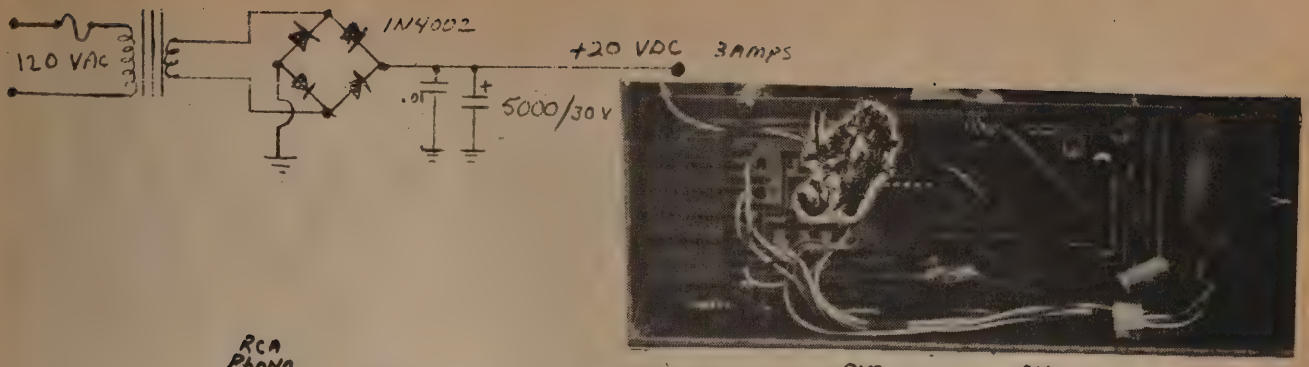
Remember to keep everything well shielded and leads short. I find that double sided PC material is available from surplus houses cheap, and it is easy to work with. The DC control board and power supply will be left up to you for layout and construction ideas. Perf board works ok since there is only one IC. Good Luck.

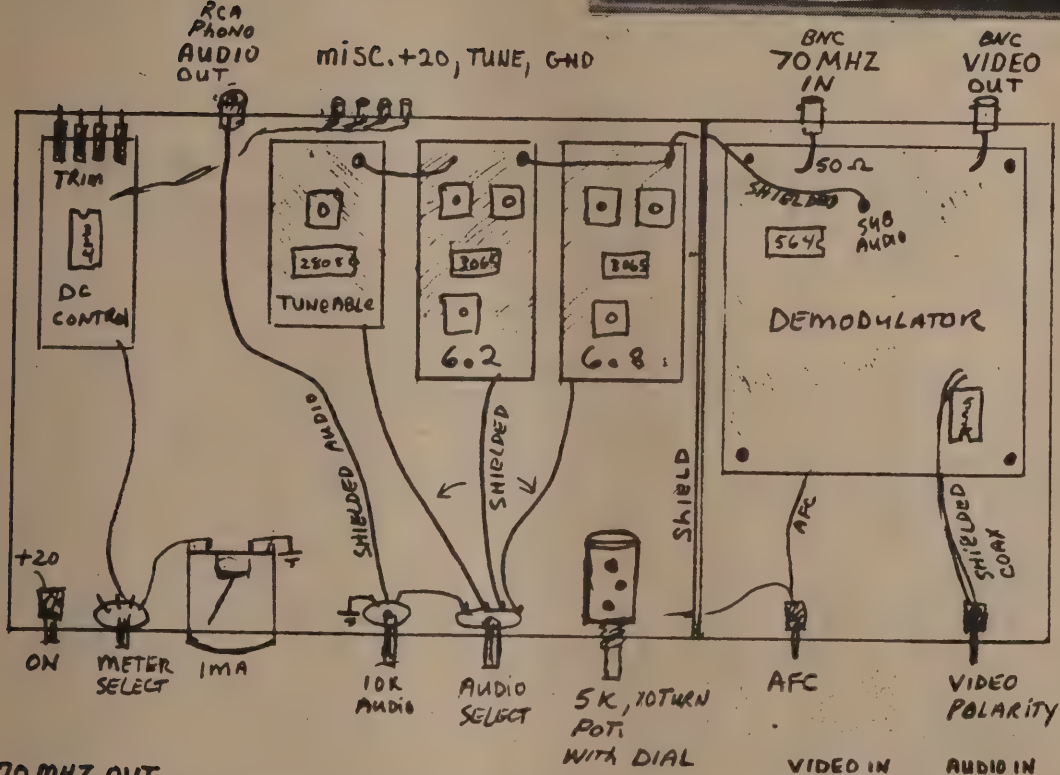
I highly recomment that you connect the audio boards direct to a stereo amplifier with good fidelity. The audio bandwidth is so wide, you will be in for a surprise when you hear the quality. Some of the channels are in stereo and they do not use 6.2 or 6.8 Mhz. They use others instead, so you will be probably building more audio boards like I did, rather than tune the ones you have. The 1st choice audio circuit can be easily tuned up while on the air, so you don't need to worry about getting it just right with the signal generator.

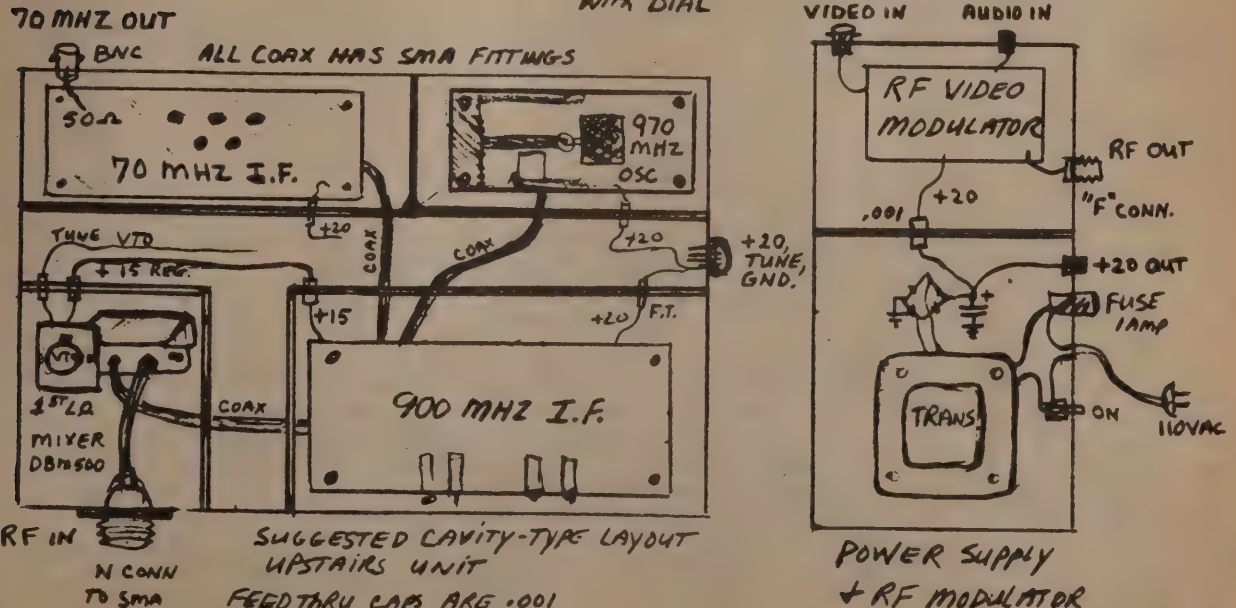
Remember if you have any questions, please send stamped envelope and I will answer quickly.

73s Gerard Wilson, WA6RDA
P.O. Box 241
Glen Ellen, Calif.

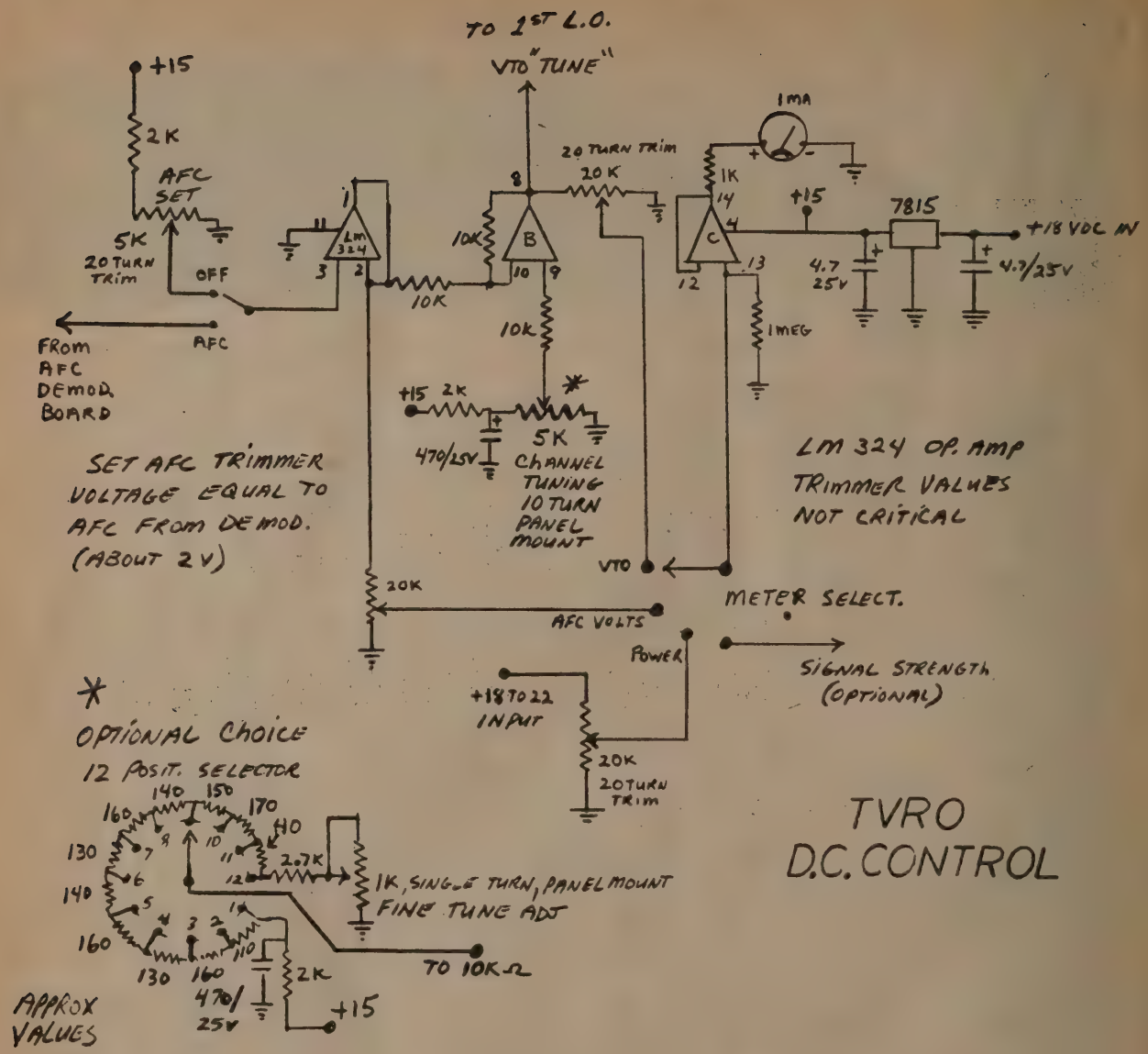
Corrections: Part 3: 70Mhz I.F. PC material should be .062 not .031.
Part 4: 900Mhz I.F. PC material should be .062 not .031.

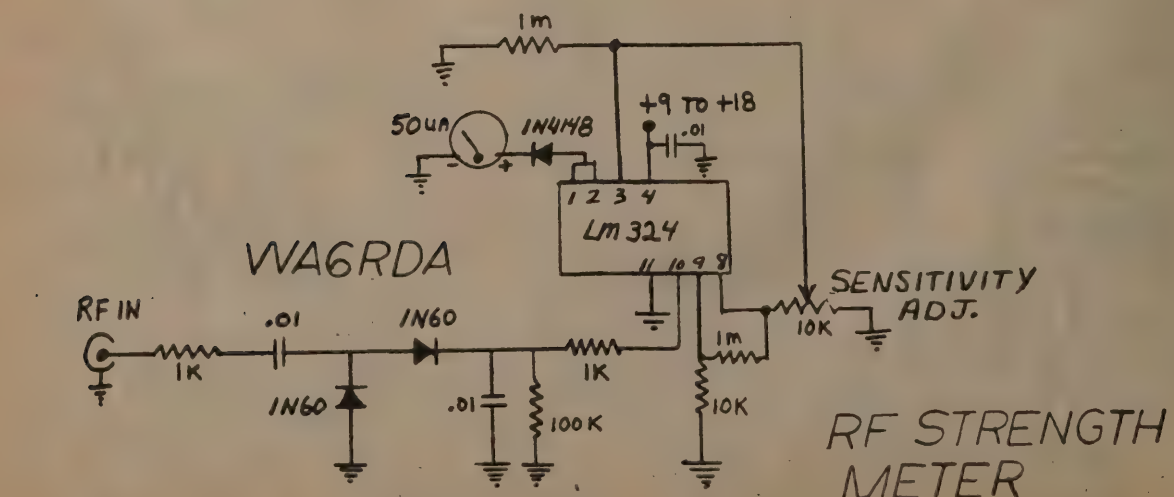




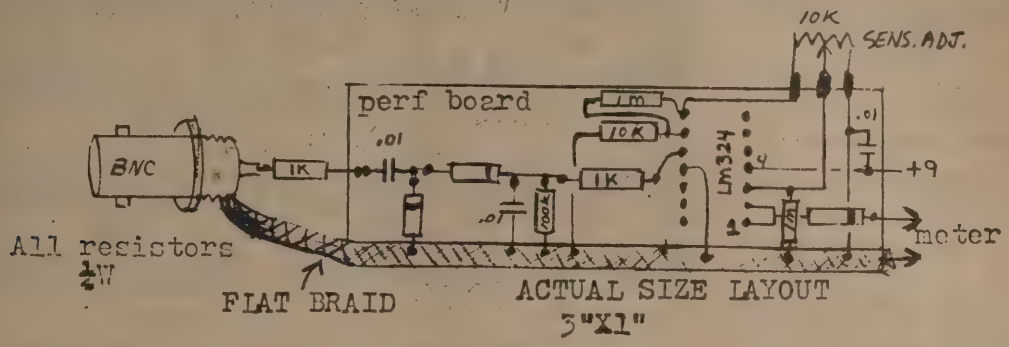


COMPLETE TVRO LAYOUT


TO 1ST L.O.
VTO "TUNE"
+15
2K
AFC SET
5K 20 TURN TRIM
OFF
FROM AFC DEMOD BOARD
AFC
LM 324
10K
20 TURN TRIM
20K
1MA
1K
+15
7815
+18 VDC IN
4.7 25V
4.7/25V
1MEG
10K
+15 2K
5K CHANNEL TUNING 10 TURN PANEL MOUNT
470/25V
SET AFC TRIMMER VOLTAGE EQUAL TO AFC FROM DEMOD. (ABOUT 2V)
LM 324 OP. AMP TRIMMER VALUES NOT CRITICAL
VTO
METER SELECT.
20K
AFC VOLTS
POWER
SIGNAL STRENGTH (OPTIONAL)
+18 TO 22 INPUT
20K 20 TURN TRIM
* OPTIONAL CHOICE
12 POSIT. SELECTOR
140 150 160 170 180 130 140 160 130 160
2.7K
1K, SINGLE TURN, PANEL MOUNT FINE TUNE ADJ
TO 10K Ω
2K
470/25V
+15
APPROX VALUES
TVRO D.C. CONTROL


1m
50uA
1N4148
+9 TO +18
.01
1 2 3 4
LM 324
11 10 9 8
WA6RDA
SENSITIVITY ADJ.
10K
RF IN
.01
1N60
1K
1m
1K
1N60
.01
100K
10K
RF STRENGTH METER

This circuit was designed originally for TVRO antenna tune up, but it has found its way into other applications. When alligning your dish antenna, hook this circuit up to the 70 Mhz I.F. line. It is very sensitive, and it will allow you to aim the dish very accurately, along with focusing the LNA. This is a relative indication, and by far is better than looking at a video signal to adjust for best reception. The 1N60's are Germanium, and use of similar types are OK. The 1N4148 is necessary to get the meter to zero by causing a .6 volt drop. Actually any silicon diode will do in its place. The meter is 40ua for best sensitivity but up to a 1ma meter will work. Mount everything inside a small plastic box with a 9v battery for portable use. Perf board works ok to mount components, just keep leads short for best UHF results. Don't use silicon diodes in place of the 1N60s or you will not be able to detect low signal levels. Other op amps can be used instead of the IM324, such as a 7447. Just watch the pin-outl.

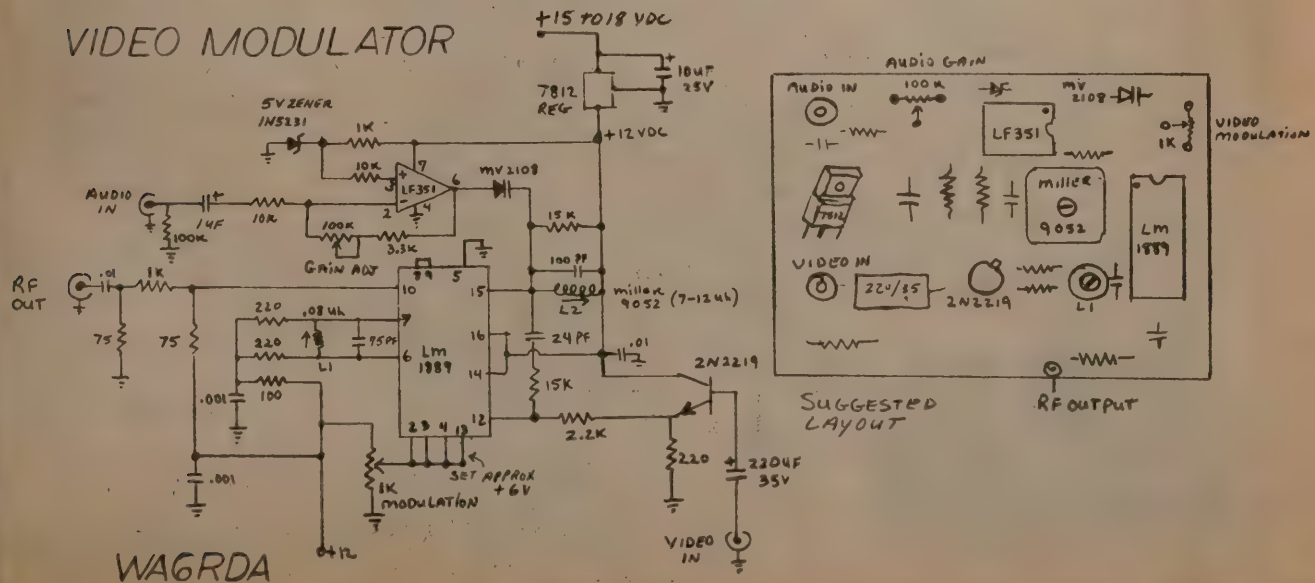


VIDEO MODULATOR

This video modulator was designed to interface TVRO to TV channel 3 or 4. The unit was constructed on breadboard pc material that had foil on one side. Pads were cut with an xacto knife, and wire wrap sockets were used. Coil L1 can be constructed from a m" slug form; wrap 2 or 3 turns of No. 20 wire. This will give approx. .08uh, and should cover channel 3 or 4 of the VHF spectrum. If you feel lucky at winding your own coils, then attempt L2 which is about 7-12 uh. Use a 3/16 slug form and wrap approx. 35 turns of No. 32 enameled wire at one end. Make it about 10 winds per layer then overlap. (neatness and uniformity not required). Otherwise buy a Miller 9052 premade coil, or equiv.

Other parts that can be substituted: 741 op amp can be used inplace of the LF351. 100k trimpot can have other values, or a fixed resistor. MV2108 varactor can be changed with one of another value, but L2 may have to be adjusted a bit different, and gain adj. may have to be decreased or increaed accordingly. TUNE-UP. If you have a freq. counter, look at RF output with 1k pot setting pin 2 of LM1889 to 12 vdc. Do not inject video or audio yet. Set slug of L1 to 61.25Mhz if operating on ch 3. Now turn down pot to read between 6 and 7 volts on pin 2 of LM1889. Couple camera or VTR to video input, and connect modulator to TV. Adjust 1kpot for best picture. Inject audio and adjust L2 for best sound. Note: if you experience a buzz on the audio, try adjusting 1k pot carefully, until a null in buzz is obtained. L1, L2, and 1k pot, all interact and may have to be adjusted several times for best performance. GOOD LUCK!

Gerard Wilson



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1982 ARRL NATIONAL CONVENTION

CEDAR RAPIDS, IOWA

July 23, 24, 25, 1982

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  Dave Farmer, N9BDH
- ★ **FLEA MARKET**
  Sat. & Sun., July 24th & 25th, Open 6 A.M.

COLLINS TOUR
No Cameras or Radios Allowed

CVARC Information Frequencys - 1800 UTC Time
MONDAY 3970 MHZ
TUESDAY 7258 MHZ
WEDNESDAY 14300 MHZ
THURSDAY 21395 MHZ
FRIDAY 28650 MHZ
By Callsign NØIAK - JIM HAMBLIM
You Will Receive Convention Information

The CVARC invites you to the ARRL National Convention, to be held in the new Five Seasons Civic Center. Excellent hotel and parking facilities attached directly to the Center. Commercial exhibits, a large flea market, excellent forums and a banquet featuring **Robert M. Hisamoto** as guest speaker. Mr. Hisamoto was born in Honolulu, Hawaii. Bob was first licensed in 1925, and he founded the Japanese Amateur Radio League (JARL) in 1926. He has been continuously active in Amateur Radio, and has had 15 different calls.

Grand Door Award - Collins KWM-380 (Drawing - Sun. 2 PM)

Convention Opens Friday, July 23, with Registration beginning at 12:00 Noon.
Exhibits Open (6:00 PM - 10:00 PM—July 23)
Ladies Activities Room Open (4:00 PM - 10:00 PM - July 23)

CONVENTION REGISTRATION (After July 1 - $8.00)..... $6.00
BANQUET (Saturday, July 24)..... $12.50
FLEA MARKET TABLES - Enclosed Area ($7.00 At Door)..... $6.00
COLLINS TOUR (Remaining Tour Capacity Is Limited) .....**No Charge**
AMANA COLONIES TOUR/WITH LUNCH..... $22.50
WEST BRANCH TOUR/WITH LUNCH..... $20.50
CEDAR RAPIDS HISTORY RE-VISITED TOUR/WITH LUNCH.. $14.50
WOUFF HONG (July 24) .....Payment at Door
CODE SPEED RUN (Record Run Only)..... No Charge

For General Information, Hotel/Motel form and Registration form: CEDAR VALLEY AMATEUR RADIO CLUB - P.O. Box 243, Marion, IA 52302. Pre-registration must be received before July 1 - All registration/Tickets will be held for arrival - CVARC will confirm pre-registration.

HOTEL/MOTEL - JULY 23, 24, 25 1982 - NO RESERVATIONS WILL BE TAKEN BY PHONE —
Reservations Must Be Received By July 1, 1982

HOTEL/MOTEL	SINGLE 1 BD/1PR	DOUBLE 1 BD/2 PR	TWIN 2 BD/2PR	TRIPLE 2 BD/3 PR	QUAD 2 BD/4PR	COMPLIMENTARY
STOUFFER'S *	$42		$52	$62	$72	Free Coffee AM
ROOSEVELT *	$38	$44	$44	$50	$56	Breakfast/Cocktails
HOLIDAY INN						
REGULAR	$37	$43	$43	$47	$51	Coffee AM
HOLIDOME	$42	$48	$48	$52	$56	Champagne PM
KING LEISURE	$46	$52	$52	$56	$60	
SHERATON INN	$32	$37	$37	$42	$47	Coffee AM
INTERNATIONAL HAWAIIAN INN	$32	$37	$37	$42	$47	Breakfast
EXEL INN	$24	$28	$30	$32	$34	Not Firm Price
HOWARD JOHNSONS	$26	$29	$33	$37	$41	Coffee AM
RED ROOF INN	$25	$28	$28	$32	$32	
TOWN HOUSE (Best Western)	$30	$35	$35	$38	$41	
VILLAGE INN (Best Western)	$28	$32	$38	$41	$44	
LONGBRANCH (Best Western)	$27	$27	$27	$31	$35	Continental Breakfast

HEADQUARTERS HOTELS (*)
ALL ROOMS ARE SUBJECT TO STATE AND LOCAL SALES TAX. CONVENTION RATES APPLY TO RESERVATION

CONVENTION CHAIRMAN -
WBØVVZ Dick Isard, P.O. Box 994, Cedar Rapids, IA 52406 -
Home (319) 364-0855, Office (319) 365-7551

REGISTRATION CHAIRMAN
WDØBHR Duane Rinderknecht - (319) 377-2761

ARRL NATIONAL CONVENTION
CVARC P.O. Box 243 - Marion, IA 52302

NEW AUSTRALIAN SSTV CONVERTERS ANNOUNCED!

We just simply "ran out of space in this issue of A5 Magazine for our planned VK3LM/ZL1LH SSTV Converter project article. It should appear in our August issue in it's entirety. We did manage, however to leave a little space for one "new" line of Australian SSTV Converters called "LM-3000". The basic design credit goes to the famous JAØBZC design as published in A5's Volume #9-2 and #10-2. Dave Cowie ZL1LH and John Wilson VK3LM have "teamed" up "down-under" to come up with one heck of a "fancy" SSTV unit that does all! There are at least 3 known built units all with different features according to the buyer's pocketbook and desires; the LM 4000 appears to be the basic scan-converter similar to the US Robot 400, while a LM-8000C model has all the "whistles and bells including 3-memory colour! The pictured LM-3000 is a "receiving converter". Some interesting features include left/right blanking, variable width control, round or square pixel generation, 128/256 resolution and 3-full page memories. Watch A5 for upcoming articles on what these two SSTV'ers on the other part of the globe are up to! Further information may be obtained directly from; (circuit boards available)

John Wilson VK3LM
14 Merrilong Street,
Ringwood East 3135
Victoria, Australia

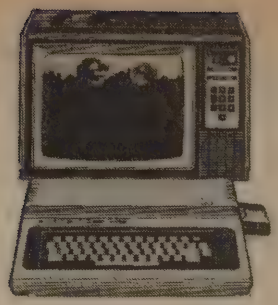
David Cowie ZL1LH
52 Prince Regent Drive
Bucklands Beach, Aucland
New Zealand

A5 MAGAZINE'S *"SHACK OF THE MONTH"*

WBØATB

Howard Burns
Rugby, North Dakota

A "Console" full of Drake, Alpha, Microcraft, Robot SSTV and other gear.



Clay Abrams K6AEP
1758 Comstock Lane
San Jose, Calif. 95124

64K RAM UPDATE

For the TRS80C Color Computer

When I first became aware of the hidden built in features of the Radio Shack Color computer, it was of interest that the computer could be up graded with more memory at a minimum expense. At first I could see no reason for doing this. I asked the obvious questions like who needs 64K RAM or 96K RAM ? I resisted the upgrade, but with 64K RAMS now available for less than $10 each it became a real possibility.

A few months ago I heard through the rumor mill that the FLEX disk operation system will be available for the TRS-80C but it will require 64K to make it operational. This was the final straw and I knew that I must upgrade. Earlier this year two articles appeared in two magazines. After reading two articles in 80 Microcomputing (ref 1) and The Color Computer News (ref 2) it became very obvious that updating the TRS-80C to 64K was possible, but the two article painted a rather confused picture of what had to be done. Each article presented a part of the overall picture and I decied to use their ideas but make my own slight twist.

I decided to make the mod as clean as possible with all wiring below the PC board. This means the mod cannot be backed out. After all who would want to do that. If your computer has 64K and has less power drain why would you want to back out the change? My change requires the cutting of lands and involves a little more work than the other magazine articles. But the net result is cleaner, and looks more professional.

TRS-80C PC BOARD LEVEL

The first decision process is to see what level your machine is. This is very simple. You could look for the part number on the PC board and see if it has a suffix letter. But the easiest method is to look to see how many shorting bars are on the PC board. If you have only two your computer is pre E revision release. If you have seven it is the E revision. If your board is a E revision you will have to swap some jumpers and make only the revision which deselects the ROMS. If your board is a non E revision make all the following steps. I included a diagram of the jumpers on a E revision board to allow for jumpering (Fig 1).

1. VOLTAGES ON THE RAMS

The first step is to remove the 4K or 16K rams from your PC board. Next remove the PC board and the ground shield on the

bottom of the board. Now obtain a sharp knife and a soldering iron. You will also need a 74LS138 IC a 33 ohn resistor and a socket. If you do not have BASIC revison 1.1 don't start on the mod. Obtain one it is required. The first modification removes some excess caps and applies the correct voltages on the 64K devices.

This is accomplished by cutting lands and adding one jumper. Look at the Figure 2 for details. This diagram shows the differences between the 64K and 16K RAM IC's. This modification will remove the plus 12 volts from pin 8 and place place 5 volts on pin 8. The wire land connected to pin 9 will be used to select the A7 address bit for the chip selection.

The land connected to pin 9 will be connected to the SAM 6883 IC.

On the top side of the board first cut out eight capacitors with sharp dikes(C61,C31,C64,C35,C67,C48,C70 & C45). These IC were used to bypass the plus five volts.

Next cut the plus 5 and plus 12 volts lands and add a jumper. This will place the correct potential on the RAMS. If your 64K RAMS are the 3764 (OKI) then the minus five volt land should be cut going to pin 1 of the IC's.

If your RAMs require plus 5 volts on pin 1 add another jumper.

2. ADDRESS A7 to 64K RAMS

Now you must make a basic decision. Do you want the mod to look professional, or do you want it to look sloppy. I'll describe the clean professionl method. All wiring is under the PC board.

On the top side of the board connect a 33 ohm resistor to pin 35 of the 6883 IC. The simplest method is to solder directly to the IC pin. Extend the resistor lead with a short piece of small wire, approximately 30 gage. From the bottom side of the board solder suck one cut end of a capacitor that was cut out. Solder the wire to the plated through hole in the PC board. With a ohm meter insure that pin 35 of the 6883 is really connected to pin 9 of the RAM IC's through a 33 ohm resistor. Also insure that all caps have been removed.

3. MEMORY SIZE JUMPER

You will next have to provide a jumper from one PIA to another

will allow the BASIC ROM (Ver 1.1 only) to know that your machine is really 32 or 64K.

On the rear side of the board add a jumper or small wire from pin 17 of U8 (6821) to pin 12 of U4 (6821).

4. DESELECTION OF THE INTERNAL ROMS

If you wish to allow the upper 32K of the RAMS to be used it is necessary to allow the ROMS to be switched out of the computer by software. This is tricky and will require some special software to take its place when you make the change. The FLEX disk operating system will do this. A schematic of this change is in Figure 3.

First remove IC U11 (74LS138) from the PC board. If it is soldered in cut it out. If it is socketed cut out the socket. This is necessary because pin 5 is shorted to ground under the IC. When this is done and the pins are cleaned up, cut the ground on the top side of the board. Add another socket and a 74LS138 and everything is normal. Next cut the grounds lands on pins 5 and 6 of U29 (74LSØ2). This will give you a free NOR gate on the 74LSØ2. Add three small wires from TP1 (R/W) to pin 5 of the 74LSØ2 and jumper pins 6 and 8 of the 74LSØ2. Next run a wire from pin 4 of the 74LSØ2 to pin 5 of the 74LS138 (U11). That the mod it sure isnt too difficult.

CHECKOUT

The last step is to make sure that everything was done correctly. Spend at least 15 min checking and re-checking all you connections. It could be very costly if you blow out some very expensive IC's. Radio Shack will not repair the unit, they will charge you for a new PC board.

Power up the unit when you get enough nerve, if it doesnt smoke and the familiar display is on the screen, type PRINT MEM. You should have approximately 24K or more RAM.

So good luck. If you migrate up to FLEX or OS9 you will have a very powerful computer as good as many expensive Z8Ø CPM systems.

I now have the FLEX DOS operating on a TRS 8ØC. The possibilities are endless. I have found that I can run all of my 68Ø9 software which runs on my big system like Pascal, Text Processors, Basic Compilers and other programs. The TRS-8ØC has now joined the world of big computer. By the time this article is published the list price of a 4K TRS-8ØC should be $299. Not bad for a small home computer. Add the 64 RAM chips and for less than $4ØØ you can have a 64K computer.

Ref 1 - 32K RAM For Free, Color Computer News, Feburary 1982, by: Frank Hogg

Ref 2 - RAM Wars, 8Ø Microcomputing, March 1982, by: Shawn A. McClenahn

FIGURE 1

TRS 80C JUMPERS E REVISION BOARD

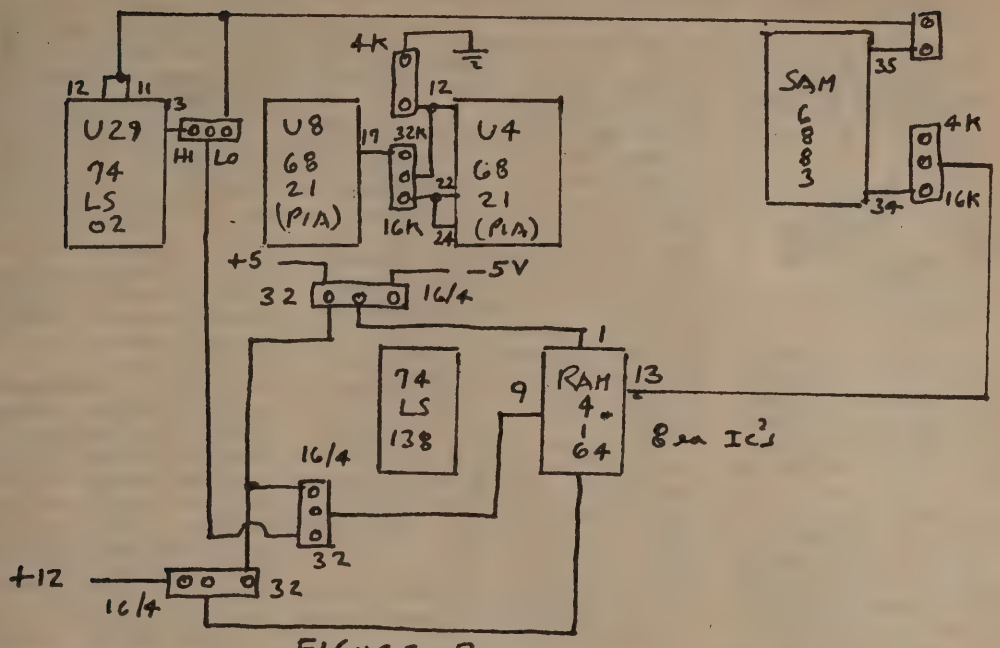


FIGURE 2

TRS 80C LAND MODIFICATIONS D REVISION OR EARLIER REVISIONS

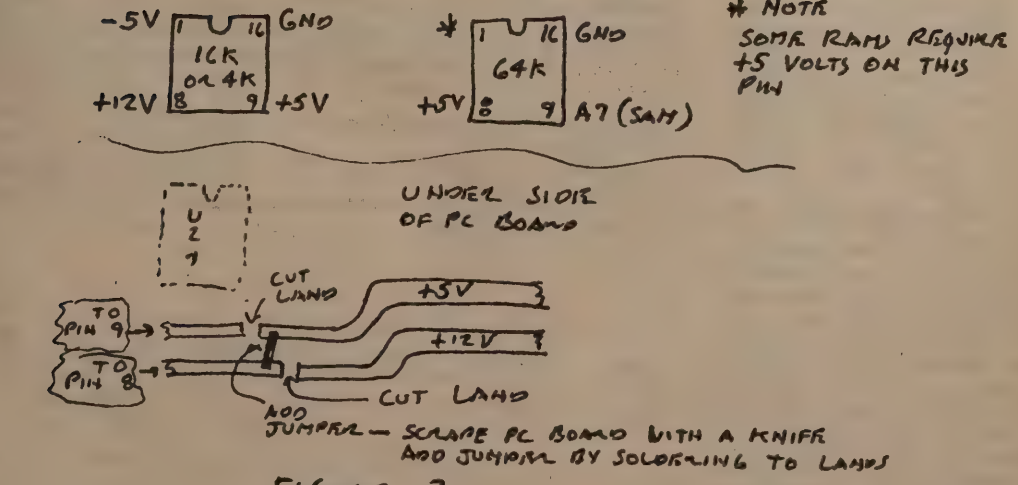
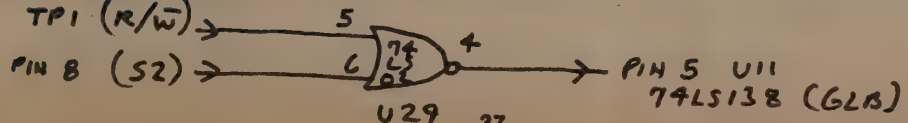
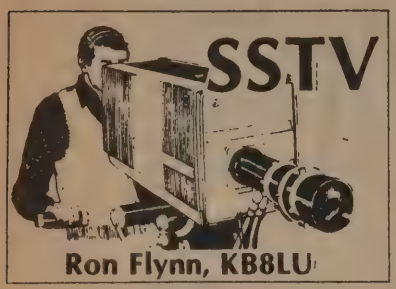


FIGURE 3

DESELECTION OF INTERNAL ROM'S, ALL LEVEL PC BOARDS



"WORLDRADIO NEWS" RESUMES REGULAR SSTV COLUMN BY KB8LU



Announcements about experiments and new developments in SSTV have been coming at a rapid rate lately. As this is written, 10 April, Dayton is just two weeks away and I'm sure we'll see more new things and maybe a few surprises there.

Jim Thomas, WB4HCV has been experimenting with the transmission of full-color SSTV pictures in one 8-second frame. Jim made his first successful 8-second color SSTV transmission in late March to WA7WOD on 14.230. No standards or format have yet been set. Experiments are continuing, and I will have more details next month.

Sam Mormino, WA7WOD has announced the development of a new mod for the Robot 400 which will allow full screen display of an SSTV picture. This is the so-called 4 × 3 aspect ratio. The Robot 400 has a 1 × 1 aspect ratio with 128 pixels per line and 128 lines per picture and blanking along the sides of the monitor. With the new mod, the entire monitor will be filled by the SSTV picture as is the case in viewing standard broadcast UHF/VHF TV. This mod will be shown at Dayton and will be available after that.

For those of you using a three-memory Robot system for color SSTV, Rich Frankenfield, WA2QAF has developed an automatic sequential transmit mode and PC board which he has been using on the air since February. Rich uses a 1-9 numbered thumbwheel switch to select the number of frames to be sent from each memory. When the TX select switch on the 400 is moved to memory, you will automatically send "two, two and two," or whatever you select. When the sequence is finished, the output of the 400 will shut down. No more counting frames on your fingers. There is ample space inside the 400 to mount the 3" × 3" PC board. This mod can also be wired to work on a standard Robot 400 to automatically transmit the desired number of frames from the one memory.

I have received copies of Rich's designs and paperwork, and he has done an excellent job. Rich has turned this project over to Sam WA7WOD for distribution. The board and perhaps a do-it-yourself kit should now be available. Write to WA7WOD for more info, and include an SASE for return reply.

Following up on last month's column on computers and SSTV, Ken Rothmuller, WA6NFA has announced the development of a stand-alone software/hardware SSTV system for the Apple computer. It was first shown at a San Francisco computer show, 20-21 March, and will next be seen at Dayton at the Commsoft booth. This system will be available later this summer. It features 16 grey level shades, increased resolution, RGB capability for color SSTV, and camera and other video inputs for direct snatch of pictures into the Apple.

Clay Abrams, K6AEP has written several SSTV programs for the TRS-80 C computer. His latest is the 7.5 program which features picture printing. Also included in this program are picture enhancement and rotation, plus a new modified keyboard program. Send an SASE to Clay (1758 Comstock Ln., San Jose, CA 95124) for a complete listing of his SSTV programs.

ROBOT 400 "FIRST SYNC MOD" by Howard McAfee KD6HF

1) Remove U26, U59, U40, and U41 and bend up the pins marked with *.

2) Solder hookup wire to tips of bent-up pins and reinsert ICs into sockets.

3) Solder the RC network together and solder it to the 400 board in a convenient place. Be sure capacitor polarity is correct. The 5VDC and ground buss' at the top and bottom of the IC rows is a good spot to solder the 10K resistors.

4) Solder the hookup wires from U26 and U59 to the RC network.

5) Solder the wire from U26 pin 3 to edge connector #9 on the 400 board.

6) Solder the wire from U59 pin 12 to edge connector #14 on the 400 board.

That completes the mod. Load a picture into memory and switch the TX select switch from voice to memory. Your monitor should blink once. This shows you it is working. If it double blinks, you need more capacitance. Use a 47mfd capacitor.

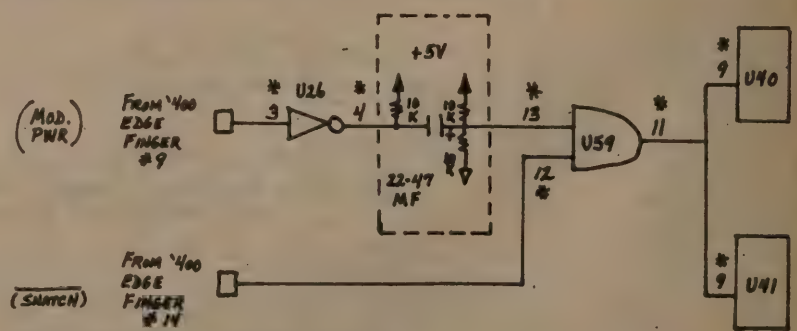
in each of the memories and switch between them. A picture of a subject in various poses can be loaded into the different memories and by switching back and forth, you will see animated motion on the black-and-white monitor. The SC422A scan converter comes equipped with this feature. Tom has two versions of this mod. The first has manual switching between memories and the second features automatic electronic switching between memories at variable rates.

Send an SASE to KB9MC and include an extra stamp or two and Tom will send you both versions.

First sync mod

This mod — developed by Howard McAfee, KD6HF — is the most useful mod I've seen for everyday SSTV use. When the TX select switch on the Robot 400 is moved from voice to memory, a sync pulse is generated which resets all receiving monitors and simultaneously resets the memory address to transmit the picture right from the top of the frame. You will need hookup wire, three 10K ¼-watt resistors, and a 22-47mfd electrolytic capacitor. See *Figure 2*.

over the air. Leave the continue/hold switch in hold. Put the display switch into camera and the memory input into camera. Focus your camera on the graphics you wish to superimpose over your picture. Adjust the snatch controls for sharp letters and true white or black contrasting background. Position your new mod switch to the color of the graphic letters, either white or black, and hit the snatch button. When you flip the display switch to memory, you will see your graphics overlaid on your picture in memory.



Worldradio
P.O. Box 160568
Sacramento, CA 95816

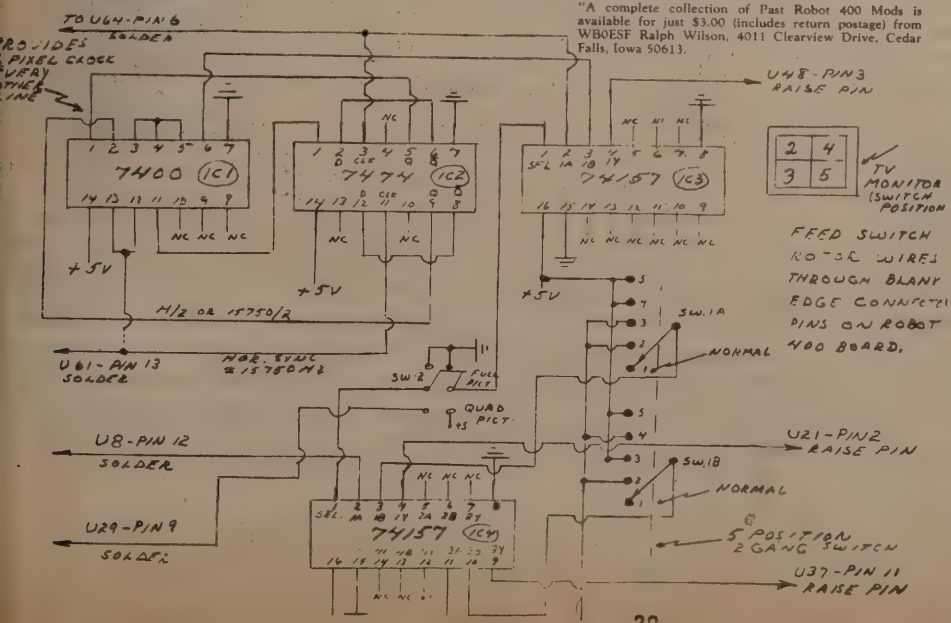
Robot Model 400 SSTV Scan Converter

"LIVE CAMERA" QUAD-FRAME FREEZE MODIFICATION

by Dan C Miller W9NTP
RR 1 Box 95
Waldron, Indiana 46182

After reading about the quading modification for the ROBOT 400 SSTV Converter in a past issue of A5 Magazine, I was inspired to devise a way to use my camera as "quad" SSTV inputs. This proved to be a bit more difficult than the original SSTV modifications since both the pixel clock and the number of lines must both be divided exactly in half. Figure 1. shows the details of the modification. The additional IC's are laid on their backs between rows of factory IC's on the ROBOT board. Small wires are then attached to the designated IC's by running small guage wire-wrap wire through existing holes in the ROBOT board. The wires to the large selector switch are run to empty pins on the ROBOT edge connector. If desired, the upside down mounted IC's can also be "glued" to the ROBOT board. IC-2, 7474, is used both to divide the pixel clock by two and the horizontal line rate by two. IC-1, 7400, is used as a buffer for resetting the 7474 and also as a gate out half rate pixels for every other line. Switch, SW-2, activates IC-3, 74157, is also used to switch between the normal scan converter operation and the quad function. IC-4, 74157, switches between the modes but in this case the IC is switched ed by a "freeze" signal from the ROBOT. This can occur automatically or by activating the push button located on the front of the converter. The 5-position switch SW-1A, SW-1B, is similar in operation to that in the original quad modifications. It is possible that SW-2 could be eliminated by using another gang on SW-1 but the increased versatility of having the operation diversified was thought to be better. The small TV monitor image shown in the diagram below, shows what you can expect from the various positions of SW-1. Using the modification is "lots of fun" with the possibility of putting your own callsign or image on someone elses picture and sending it back to him like expensive keyboards. The possibilities are endless!

W9NTP LIVE CAMERA QUAD FRAME FREEZE



"A complete collection of Past Robot 400 Mods is available for just $3.00 (includes return postage) from WB0ESF Ralph Wilson, 4011 Clearview Drive, Cedar Falls, Iowa 50613.

DEVOTED TO HAM TV

AMATEUR TELEVISION MAGAZINE
World Wide DX SSTV Contest

This is the "big one"! Don't miss it! Our 2nd Annual International World Wide DX SSTV Contest starting at 0000Z Saturday, July 17th and ending at 2400Z Sunday, July 18th, 1982. Once again, our successful and fun operating contests have been due to the emphasis on "quality" not quantity. A 48-hour SSTV-Video Contest on 10-80 Meters within the recommended SSTV calling/operating frequencies listed below with special "bonus" points awarded to those operators who exchange "mugshots, 1/2 speed format, color, motion animation, and a new bonus qualification of quarter-framing grab and replay. Callsigns and video reports must be in "video" form, mugshots of the station operator and/or family/friends can count only once, slower clock-rate speeds are encouraged in either 128 16.5 seconds or 256 32 second time bases, color work must contain a minimum of 2-color overlay to qualify with standard RGB frame transmissions, motion SSTV must have a minimum of 2 frames sent with automatic receive switching circuitry or manually operated switching by the receving operator, and 64X64 "quadrant" storage of no less than 4 separate pictures with replays. To encourage all-band contest usage and promotion, extra bonus points are granted on the 10-15-40 and 80 meter band segments. Single and Multi-operator stations are recognized with crossband contacts not permitted. Individual contacts count only once per band with repetitive multi-band contacts acceptable. Stations over 25 DX-Countries worked add 25 points, 50 DX add 50 points over 100 DX add 100 points! Each SSTV two-way contact is worth 5 pts. (plus band and bonus multipliers) within the same country, 10 points for DX out of country. Submission of logs with totaled scores must be postmarked no later than August 1st, 1982 and submitted to: Contest Manager, A5 ATV Magazine, PO Box H, Lowden, Iowa 52255-0408. (Logs will be returned as will any photos, etc.)

Frequencies of Operation (Sug.)

	Advanced/Extra	General
80 Meters	3.845	3.990
40 Meters	7.220	7.290
20 Meters	14.230	14.340
15 Meters	21.340	21.440
10 Meters	28.680	28.680
6 Meters	50.150	50.150

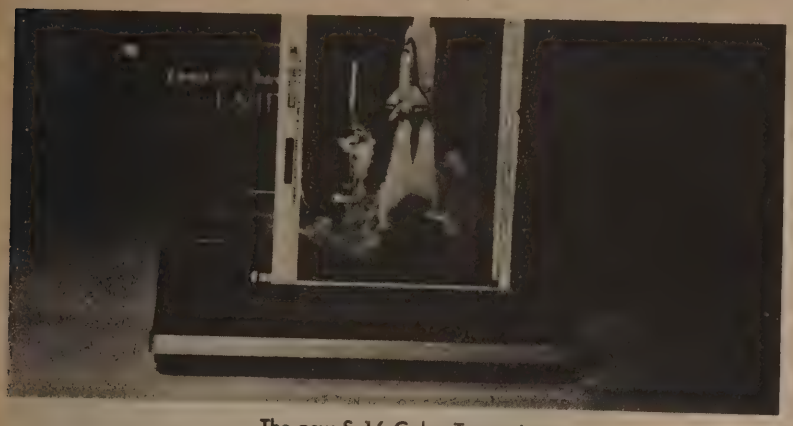
Bonus Points/Multiplication Factors

Mugshots	1 point
Slow-speed	2 points
Quad-frame	3 points
Motion SSTV	4 points
High Resolution	5 points
Color SSTV (RGB)	10 points
6 Meters	times 2
10 Meters	times 2
15 Meters	times 2
40 Meters	times 3
80 Meters	times 3

AWARDS: 1st place winner receives a 3-year subscription (worth $60.00 Surface US/Canada $78.00 foreign Surface) to A5 ATV Magazine with front cover picture plus Gold Certificate, 2nd and 3rd place winners receive one-year's subscription and Gold Certificate, all entries regardless of score will receive Gold Certificate suitable for framing. Results will be in the November issue, some log-sheets and DX Country lists available from WBØQCD. Contest entry verifications audited by Ralph Wilson, WBØESF or Cedar Falls, Iowa. Good Luck!

"Promotion of this contest in QST, 73, CQ, Ham Radio and WorldRadio"

COLOR FACSIMILE PHOTOGRAPHS BECOME REALITY



The new S-16 Color Transmitter

UPI introduces color transmitter

United Press International announced (February 2) development and production of a color picture transmitter that will provide more color photographs for the front pages of America's newspapers.

F. William Lyon, vicepresident for NewsPictures, said the UPI 16-S Color Transmitter is being installed at UPI bureaus and at several newspapers around the country.

"By the end of 1982, UPI bureaus across the U.S. will be sending color of regional interest to UPI NewsPicture subscribers," Lyon said. "There will be more color photos, from more locations and on more subjects than ever before."

UPI will also install color transmitters in Asia, Latin America and Europe, Lyon announced.

UPI has sent color telephotos for years, capturing such events as presidential inaugurations and space shuttle launches. These color photos were sent from a limited number of major bureaus that had color separation capability.

The news service's new color transmitter is a technical modificaton of the popular UPI 16-S, considered the industry's standard. UPI is increasing the number of locations from which color can be transmitted by converting existing 16-S equipment in more than two dozen picture bureaus. These bureaus will also make use of newly-developed fast color print materials.

"UPI subscribers will notice more color photos from closer to home on such subjects as sports, politics and breaking news. This will mean fast, usable regional color," Lyon said.

The 16-S Color Transmitter is different from the standard 16-S in that it is fitted with color separation filters to provide individual Unifax-II picture receptions for making cyan, magenta and yellow printers. The separations are then used to produce a color photo in the receiving newspaper.

Papers that do not have their own color separation capability may use the same equipment—the 16-S Color Transmitter and a Unifax-II picture receiver—to produce fast, inexpensive in-house separations. UPI offers the color transmitter to newspapers for purchase or lease, and UPI also will sell papers that already have conventional 16-S transmitters an inexpensive "color conversion kit" to upgrade to color transmissions.

"More and more, newspapers are using color photos," Lyon said. "In particular, editors are looking for good spot color. UPI is taking the initiative to produce a greater range of color selections."

EDITOR & PUBLISHER for February 6, 1982

State of the art

by K.V.G.

9 MHz CRYSTAL FILTERS

MODEL	Application	Bandwidth	Poles	Price
XF-9A	SSB	2.4 kHz	5	$50.60
XF-9B	SSB	2.4 kHz	8	68.60
XF-9B-01	LSB	2.4 kHz	8	91.35
XF-9B-02	USB	2.4 kHz	8	91.35
XF-9B-10	SSB	2.4 kHz	10	119.85
XF-9C	AM	3.75 kHz	8	73.70
XF-9D	AM	5.0 kHz	8	73.70
XF-9E	FM	12.0 kHz	8	73.70
XF-9M	CW	500 Hz	4	51.55
XF-9NB	CW	500 Hz	8	91.35
XF-9P	CW	250 Hz	8	124.95
XF910	IF noise	15 kHz	2	16.35

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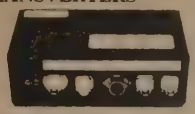

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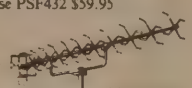

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Here, for your information, are the comments that we filed with the FCC on their NOI/NPRM for permitting spread spectrum on vhf ham bands:

Before the
Federal Communications Commission

In the Matter of	)	
	)	
Amendment of Parts 2 and 97	)	
of the Commission's Rules	)	
and Regulations to	)	GEN DOCKET NO. 81-414
authorize spread spectrum	)	
techniques in the Amateur	)	
Radio Service.	)	

COMMENTS

1. The Amateur Radio Research and Development Corporation (AMRAD) supports the FCC's proposal to authorize spread spectrum techniques in the Amateur Radio Service, qualified as follows:

(a) AMRAD recommends extending spread spectrum techniques to General and Technician Class as well as Amateur Extra and Advanced Class licensees. In our experience, there is no reason to believe that the ability to competently handle spread spectrum technology lies mainly in the higher class licensees. Nor, is there reason to believe that the General and Technician Class licensees will act less responsibly on the air with spread spectrum.

(b) AMRAD believes that the door should be left open for codes other than the specific shift-register configurations described in the Appendix to GEN DOCKET NO. 81-414. To restrict codes as proposed in the Docket would tend to limit experimentation. This objection would be removed if there were a provision for FCC registration or approval of additional codes written into the Rules.

5. There may be a problem specifying the use of the center frequency for station identification as in the proposed Rules change. Designation of certain "home" frequencies may be a more workable system. We have no objection to the center frequency initially with a future option of redefining this requirement based on experience. Further, we suggest that the proposed wording of Section 97.84 (h) include a standard, concise format for identifying. E.g., "DE WD4IWG/SS 100 kHz," would mean that spread spectrum is being transmitted over a 100 kHz bandwidth centered on the indentifying frequency. A brief standardized format would permit development of automatic methods for telegraphic identification.

6. AMRAD is somewhat concerned about spread spectrum's potential for abuse if authorized for the Amateur Radio Service. On balance, however, we feel that the advantages to stimulating state-of-the-art experimentation by permitting spread spectrum outweigh the disadvantages. Nevertheless, it is incumbent on both the Commission and historically self-policing radio amateurs to closely monitor the progress of spread spectrum and take appropriate steps to minimize possible abuse. In order for the Amateur Radio Service to continue to be self policing, amateurs need to develop the means of detecting and identifying spread spectrum transmissions as well as locating sources of interference. Therefore, AMRAD plans to propose a program (in coordination with the FCC Field Operations Bureau and with the American Radio Relay League) to develop a capability for amateurs to self-police their spread spectrum operations.

7. Below are our answers to the specific questions posed in paragraph 15 of GEN DOCKET NO. 81-414:

2. AMRAD is an experimenters' radio and computer club of over 500 members. We applied for, and were granted on March 6, 1981 a Special Temporary Authority (STA) to conduct specified on-the-air experiments with spread spectrum techniques. Briefly, these experiments were:

Experiment 1 - HF Frequency Hopping (using commercial/military transceivers on the 80, 40 and 20 meter bands)

Experiment 2 - 10-Meter Frequency Hopping (using modified Citizen Band radios)

Experiment 3 - UHF Direct Sequence (using modified amateur television [ATV] transceivers)

Experiment 4 - Earth-Moon-Earth Spread Spectrum (using an 84-foot dish at Cheltenham, MD)

Experiment 5 - 2-meter Frequency Hopping (using modified commercial VHF-FM transceivers)

3. The above experiments are only partially completed. Only Experiment 1 has been concluded. Experiment 2 is in the breadboarding stage. Experiment 5 is ready for on-the-air testing except for a critical part due from a supplier. Little progress has been made on either Experiments 3 or 4. Lack of substantial progress on some experiments was due to the inherent reliance on voluntary experimentation by individual amateurs as well as competition of other activities. The results of AMRAD's spread spectrum experiments will be detailed for the Commission in a separate report on or about March 6, 1982.

4. Because the above experiments include spread spectrum techniques not permitted under the proposed Rules change, AMRAD intends to request a new STA after completion of the report and after consultation with the FCC staff.

(a) The emission limitations specified in the proposed amendment to Section 97.73 are considered to be sufficient until such time that experience indicates otherwise.

(b) Although our experience is necessarily limited at this time, it appears that spread spectrum interference to conventional amateur communications will not be a major problem. Of the various conventional amateur modes, radioteletype operation (including packet) appears to be the most vulnerable.

(c) It is not believed necessary for the Commission to have the capability to monitor the content of all amateur communications. However, it is definitely necessary for the Commission to be able to detect spread spectrum signals and identify them. Further, it would be desirable for the Commission to be able to make pre-detection recordings and decode spread spectrum signals when required.

(d) The specific shift registers proposed in the ammendment to Section 97.117 of the Rules are not considered to be an obstacle to self-monitoring by the amateur community.

Respectfully submitted,

February 26, 1982

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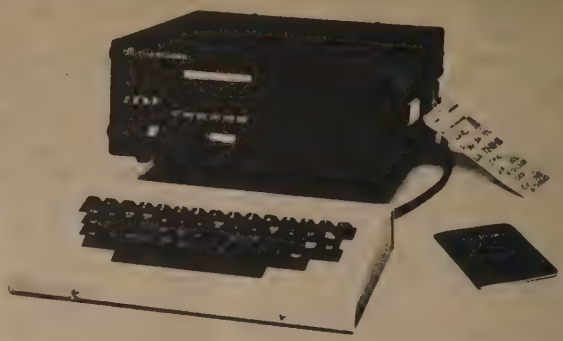

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(And you thought there was no such person? Readon!)

According to most commentators, Ulysses Sandor Ascii was born in Rahway, New Jersey on February 2, 1903. His date of birth remains uncertain due to the unfortunate fact that two commentators, Hilda B. Ascii and Bruno Lollomalopalado are now deceased.

Miss Ascii continually claimed that she was the eminent Dr. Ascii's daughter, but no evidence has surfaced to legitimize her claim. Prof. Lollomalopaldo is remembered by some as the foremost historian of Hawaiian culture in New Jersey.

Ulysses' parents were by all accounts immigrants from the Breaker on Yllivvin in Walse. With all their earthly belongings and four ham sandwiches, they boarded the ill-fated steamer H.M.S. Bempley some time in 1889 and travelled steerage to the Port of New York. Legend has it that an immigration official recorded the family name as "Ascii" as a truncated derivation of the actual name, recorded in the register of St. Fidgeta's Church, Breaker on Yllivvin as "Askew." The father is recorded in the same place as Pellew D., named his son for Ulysses S. Grant and is believed to have maintained that Grant was President of the U.S. for most of his life. The senior Ascii deified Grant, and his picture is said to have hung next to that of the Tsar while the family still lived in Walse.

Pellew D. Ascii settled his young family in Rahway, attracted by its Hawaiian culture and Old World manners. Sundry newspaper files report that he died minutes after Ulysses' birth. The cause of death was given as shock.

Ulysses reputedly left home at the age of eleven to study communications theory with Prof. Flanders Watthour, K.C., the leading psychic medium in the Rahway-Elizabeth community. Together, they outfitted an expedition and established the Secret Pellew Colony in Union City, NJ in 1916. Some of their earliest communications experiments are still positively recalled in various taverns in Union City and Weehanken. The colony was forcibly disbanded by paramilitary vigilantes in 1920. Brought up on charges involving the allegedly obscene rites of the colony, Ulysses was returned to Rahway where he completed his education as a guest of the state. Prof. Flanders Watthour (q.v.) disappeared with most of the papers and written records of the colony.

A few fragments were recovered at high tide in Bayonne, NJ, quite by accident when an ESSO oil barge struck what appeared to be a cement buttress. Upon closer examination, it was found to be an earlier attempt to construct Grant's Tomb according to plans drawn by a relative of Cornelius Vanderbilt.

Beneath the tomb was a leaden box which was covered with mystical symbols and signed by Emil Baudot. The box contained detailed drawings which, upon examination by the entire faculty of Columbia University in the Spring of 1951, proved to be the incoherent crayon scribblings of a man named (fnu?) Murray (lnu?).

U. S. Ascii studied with Dr. Bruno Lollomalopaldo and the Rev. Alexander Babafray, fellows of Rahway state as well. Letters ascribed to Ascii's maternal uncle Pincas M. Basarab of Shamokin, PA tell little of his studies. Envelopes show that Ascii gave his return address as Penn. State instead of State Pen., probably to save the family's name.

After graduation from "Penn. State," Ascii's career demonstrated considerable misdirection. His only known novel, set in Secaucus, NJ and titled, "Not a Pig Left Anywhere," was put into type by inmates at his alma mater and sold only thrge copies, all to his uncle Pincus.

Details of his life after this point became sketchy. We are able to surmise only that after the experience as a failed author, Ascii moved to Baltimore where he took to the sauce. He was known for his preference in imported wines (Balihi mostly, Ripple when he could get it).

Ascii became increasingly despondent during this period and took to long stays around the Baltimore wharves where he amused himself by gambling away the little money that was his. To pass the time of day, he spent odd hours in Engine Company No. 5 devising Fire Codes. His one-alarm, two-alarm, etc. system caught on and was eventually recognized by the National Embers Society.

In 1933, he was one of the players in an historic game of liar's poker at Windy Paradise Cafe on Water Street involving two fellows named Ebb Cedick and Rene Wei Paquet, who claimed that he had a "code in the node." Using his own method of beating the system (the Chinese remainder theorem) Ulysses won a used Philco radio with only one knob missing. In reconstructing the damaged apparatus, he stumbled onto vital principles of electronics and mathematics. His career took a turn for the worse when a patent based on these ideas was turned down. Later students of Ascii discovered that the devices were the 1001 and 2002 processors, something that Intel wishes could be left out of history books.

He also invented a new optional seven or eight hole (or no-hole) code with unique assignments for everything he found on a discarded typewriter which was missing the fraction key. On the (free) advice of former patent attorney, he filed a trademark application, which was thrown out by the patent office as a frivolous application without merit. The same code was later submitted as someone else's work and eventually adopted by the ANSI X3 committee. Ulysses finally achieved recognition in 1968 when the X3.4 Task Group voted to name their code "ASCII," but not without many grueling night sessions to expand the 'acronym' to American Standard Code for Information Interchange. Ascii finally achieved parity by having his name on his original invention.

Back to the early days in Baltimore. Falling again into despondency, he threw his lot in with the mystical, migrant, bandit gypsy, Tungar Geschnetten. As a member of his band, he lived in the Jersey Pine Barrens, living off the land and robbing travelers until routed by an expedition of state police led by Lt. Ungar Throughput.

Convicted and sentenced again to Rahway, he became a tenured professor and is known to have taught classes in Meat Science, Greek Athletics and Electronics. Some accounts have it that he married a cafeteria employee, Kay Nada. But no proof of this bond has thus far surfaced. Ulysses Ascii collapsed and died at Rahway on November 4, 1969. Medical examiners recorded that he choked on a prune pit but that foul play was suspected.

His remains were interred in the Hudson River, down wind of Bayonne Harbor by citizens' petition. He lies today near the same mystic monument to General Grant, his namesake. For further reference, consult "Sternwallow's Annals IX."

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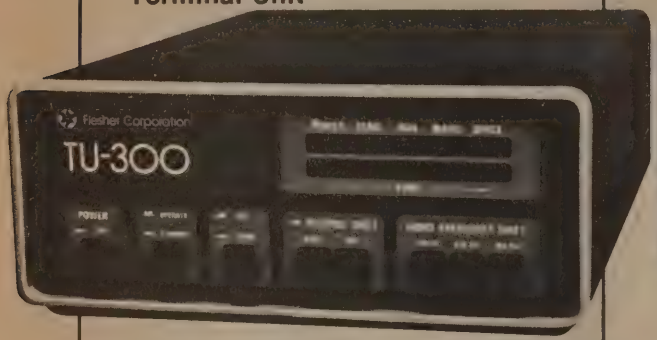

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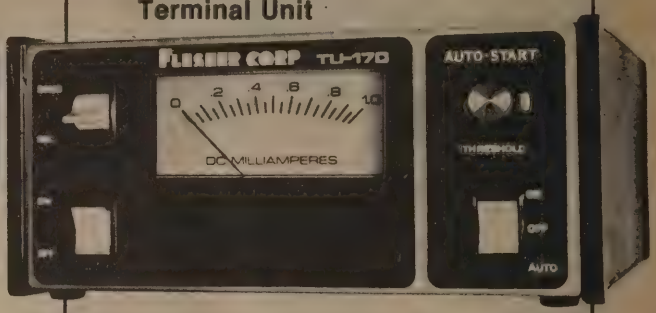

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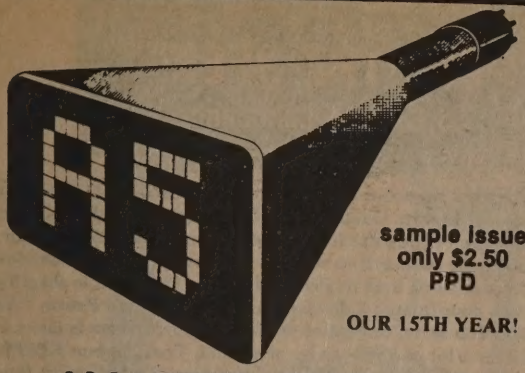

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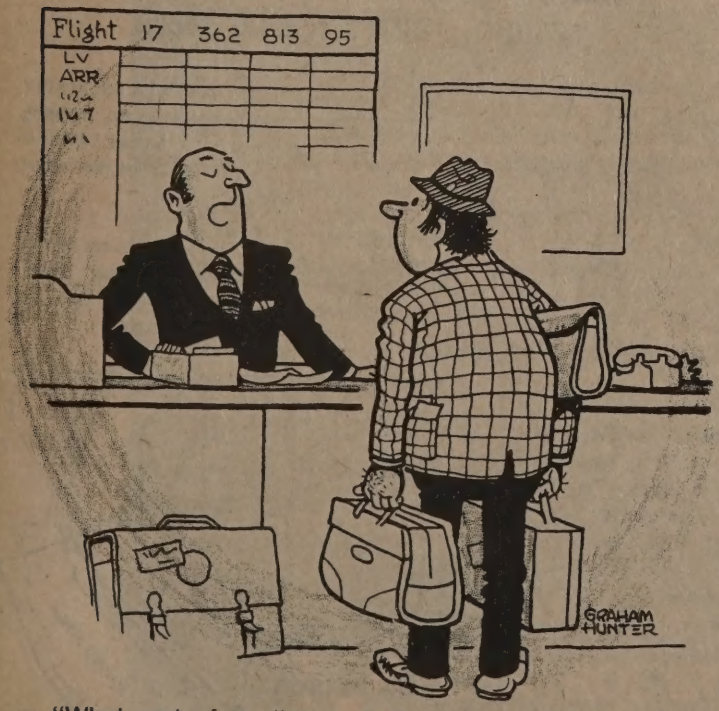

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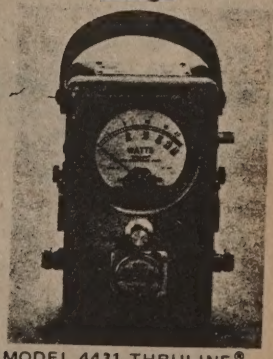

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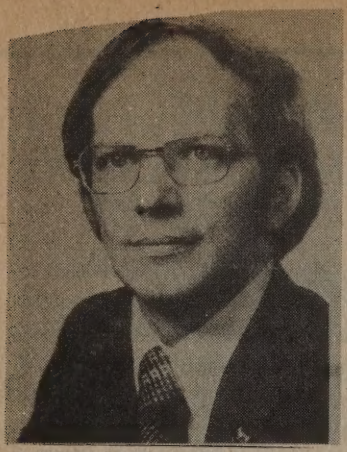


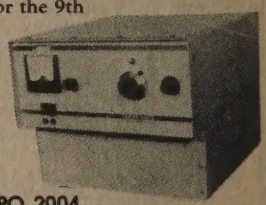
David Sumner, K1ZZ, new ARRL Headquarters general manager and *QST* editor. QST

"OFF THE REEL"

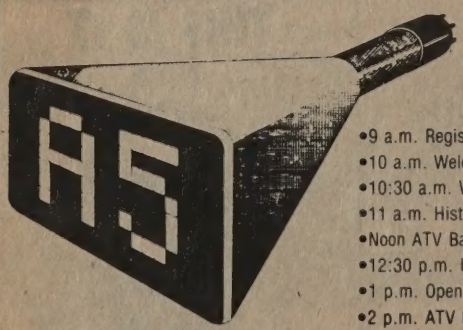
A5 Editorial Comments

I made an unforgiveable error on one of the front cover photos; Ron Cohen W3ZKO is standing with Henry Ruh and myself, not Al Lipkin. Guess I was "dreaming" about those beautiful mountains out in Utah or something when titling the front cover picture. Sorry Al and Ron!

QCD's "soapbox" will be brief this issue (hooray!) so to allow for the bottom page announcement of a Midwest Fall ATV Conference to be held in Peoria, Illinois. The event is shaping up to be well worth the drive including a coordinated 2-day ham fest put on by the Peoria Amateur Radio Club. The National ARRL Hamfest and Convention in Cedar Rapids, Iowa is just a few days away and A5will be there! Besides a lot of FSTV to be presented, Tom Hibben KB9MC has consented to organize the Black/White and Color SSTV presentations including his famous "Motion Animation" SSTV using a standard Robot 400! I had a very interesting phone conversation the other day with Bill Tynan W3XO of QST "World Above 50 Mhz." fame in regards to the reporting (or shall we say the lack of it) on FSTV DX reports, etc. in the 400 Mhz. regions. Bill assured me that there is no negative feelings toward ATV on his part and that he would be glad to publish DX accomplishments, etc. that is sent to his attention. Let's send reports to: PO Box 117, Burtonsville, MD. 20866. The "League" is sure seeing some big moral changes lately under the leadership of David Summer K1ZZ. David was quoted in the "June" issue of Worldradio to say that "I regret we spend so much time doing the same thing over and over. There's room for the DX'er to get into SSTV or for the ragchewer to get into Moonbounce." The 34 year old ARRL General Manager contiued; "There will be new horizons-new worlds to conquer. Digital voice and spread spectrum will have a tremendous impact." A5 Magazine once again welcomes David's specialized communication views as a "fresh" approach to new thinking at Newington. Let's hope he is able to implement some of his ideas! Helping David to get the specialized point of view across will be Don Miller W9NTP of Waldron, Indiana who is rumored to be rerunning for the 9th District Director again after a quite contested election last fall. Don was the first ATV'er to display a working one-frame color SSTV system this year at Dayton. W0LMD is also following up with tests on twenty meters for one-frame color. It is just a matter of time before the awkward RGB sequences fade into the history books. Ever wonder why there are those great $100 rebates from Robot? (Something's brewing!). A5 Magazine spoke with Ted Henry Jr. and arranged for Tom O'hara of PC Electronics to "test out" their new TEMPO 2004 UHF high-power linear just released. Even at n power, the UHF amplifier might become the best heavy-duty rated linear for the FSTV enthusiast to acquire. As soon as the test facts are in, we will publish them for you (hopefully in our August issue). Enjoy the reading and start swinging those ATV antennas!



TEMPO 2004



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- 9 a.m. Registration and Display rooms open
- 10 a.m. Welcome and agenda-WB0QCD-A5 Magazine-Iowa
- 10:30 a.m. W6ORG FSTV Videotape presentation-Calif.
- 11 a.m. History of Amateur Television-KB9FO-Indiana
- Noon ATV Basics
- 12:30 p.m. Using computers on FSTV-W9RI Illinois
- 1 p.m. Open Lunch
- 2 p.m. ATV FLYBY Demo/Antenna measuring contest/Airport
- 6 p.m. ATV Dinner banquet (Guest speaker 7 p.m.) W9NTP Ind.
- 8 p.m. ATV group reports (Show n tell)
- 10 p.m. A5 Magazine Hospitality Suite Open Till?

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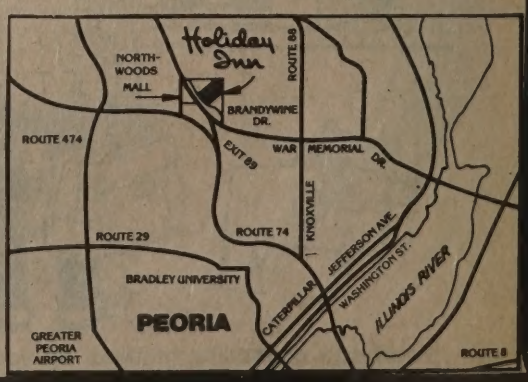

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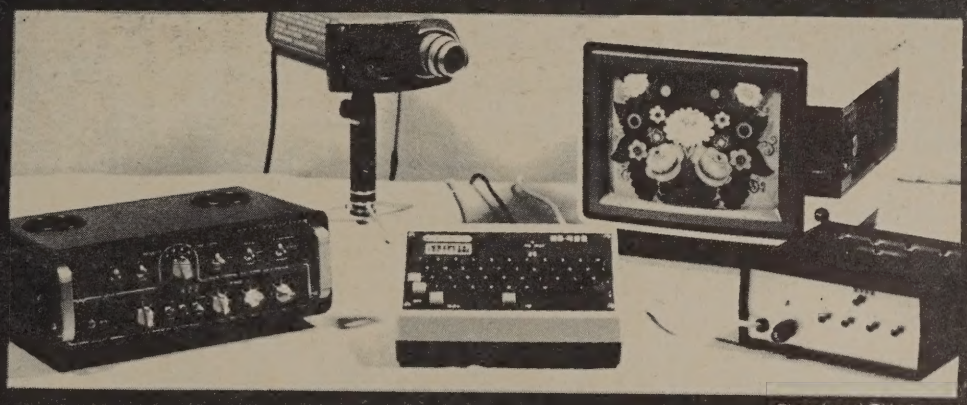

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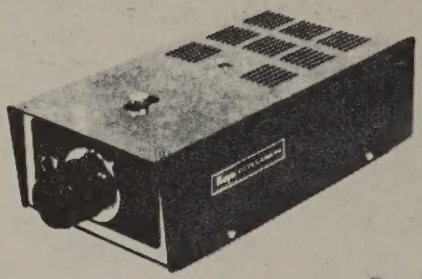

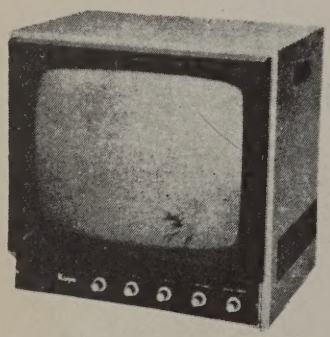

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